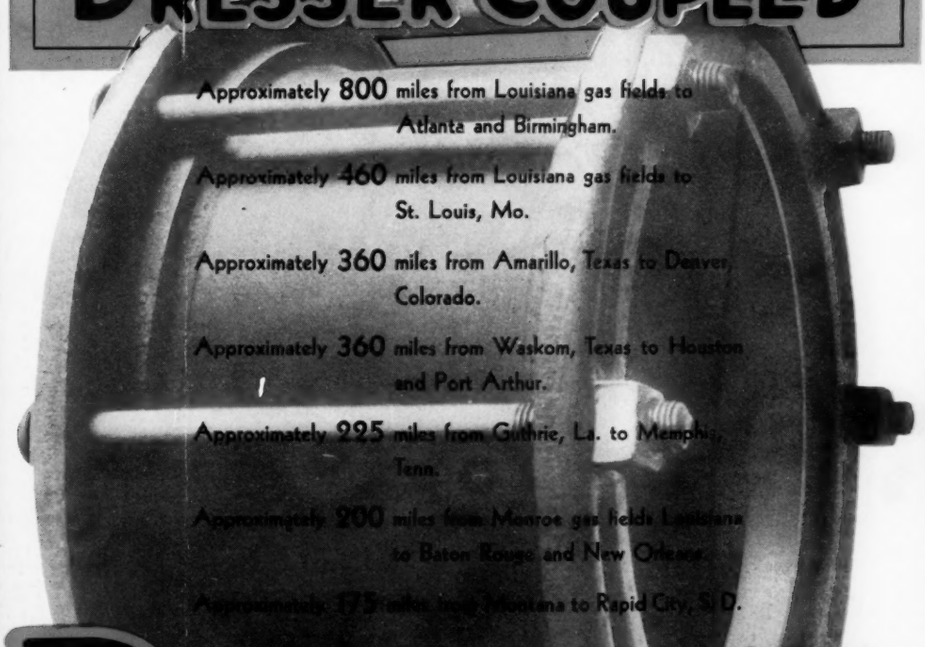
WESTERN GAS

June
1930

20 Cents
the Copy

Of the recently installed long-distance lines for gas transportation
The major systems have been

DRESSER COUPLED



Approximately **800** miles from Louisiana gas fields to Atlanta and Birmingham.

Approximately **460** miles from Louisiana gas fields to St. Louis, Mo.

Approximately **360** miles from Amarillo, Texas to Denver, Colorado.

Approximately **360** miles from Waskom, Texas to Houston and Port Arthur.

Approximately **225** miles from Guthrie, La. to Memphis, Tenn.

Approximately **200** miles from Monroe gas fields Louisiana to Baton Rouge and New Orleans.

Approximately **175** miles from Montana to Rapid City, S. D.

DRESSER
COUPLINGS *Dominate!*

S.R. DRESSER MFG. CO. Bradford, Pa.

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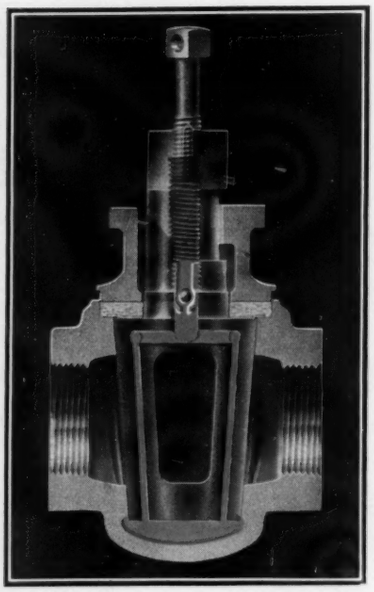
A MONTHLY JOURNAL DEVOTED TO THE WESTERN GAS & APPLIANCE INDUSTRIES

WITHSTAND PRESSURE FAR IN EXCESS OF RATING

NORDSTROM VALVES



500# VALVE withstands 1700# pressure test

Nordstrom Valves are manufactured with an extra high safety factor of at least 10 to 1. In other words, a Nordstrom Valve that will prevent leaks at 250 pounds pressure will withstand a bursting pressure far in excess of this rating. Note the report of California Testing Laboratories shown at left.

A patented lubricating principle makes Nordstrom Valves leak resistant and easy to turn. Special "Merco" Lubricants are available for all valve installations and should **always** be used in Nordstrom Valves for the most efficient valve service.

Ask for complete details.

Report by CALIFORNIA TESTING LABORATORIES

A Nordstrom semi-steel plug valve, 2½" screwed, 500 pounds working pressure, was recently tested by the California Testing Laboratories. According to the report of test, internal hydrostatic pressure was applied to this Nordstrom Valve with valve in "closed" position. The pressure was increased until a maximum of **1700 pounds per square inch** was reached.

There was no plug or gasket leakage at this pressure!

Merco Nordstrom Valve Co.

SUBSIDIARY OF THE MERRILL COMPANY

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Atlanta: Healey Building
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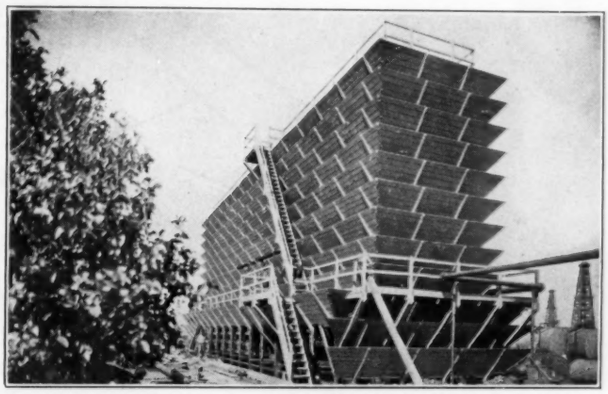
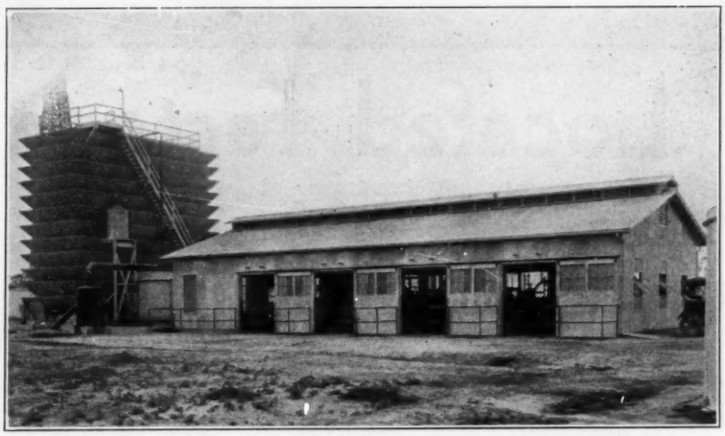
AGENCIES IN PRINCIPAL CITIES

Factories in U.S.—Oakland, Calif., and Belleville, N. J.
Canada—Peacock Bros., Ltd., Montreal, Toronto, Winnipeg, Vancouver. (Also Sydney, N. S.)
England—Audley Engineering Co., Ltd., Newport, Shropshire.
Buenos Aires, Argentine—General Electric, Soc. Anon., Victoria 618 Esq. Peru.

Over 1600 Fluor Cooling Towers in Service Throughout the World

FLUOR Cooling Towers are fabricated of California Redwood throughout and are fitted with brass and copper hardware. Gravity splash type distribution, incorporating the highly efficient Fluor double panel bowed type cooling deck. Wide overlapping louvers and adjustable spray eliminators. Thirty-two (32) different standard sizes provide a suitable selection for any service. Capacities up to 1000 gallons per minute can be supplied from stock. Erection crews maintained in California and throughout eastern territory for rapid erection service. Special types and models designed for any specific site or condition.





The New Fluor Tower Incorporates:

(1) Flexibility—

All bracing, cords, posts, in fact all parts, are interchangeable. Extensions may be added to height or length.

(2) Portability—

Tower may be easily dismantled and re-erected by common labor.

(3) Strength—

Guaranteed for 30 lbs. per sq. ft. wind load without guying.

(4) Performance—

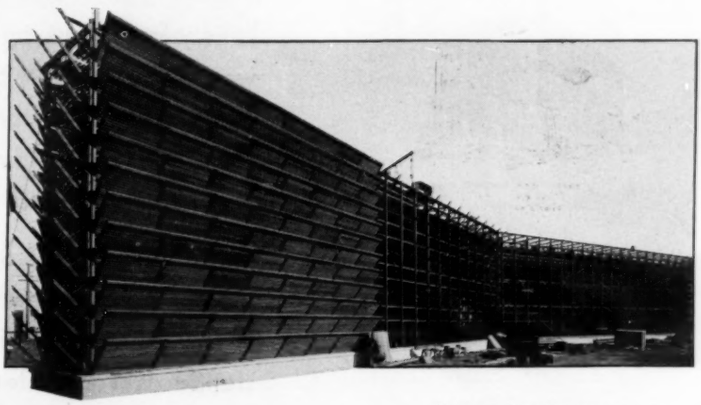
Uniform distribution at all loads; low windage loss; efficient cooling surface.

Atmospheric Coolers

Atmospheric type cooling sections for oil, gas, water, condensers, etc. Economical selections for any capacity. Cast iron or steel headers, admiralty, steel or composition tubes. Designs include many distinctive features. Pipe coils designed and installed in existing or new towers.

Construction Service

Complete design and construction of gasoline absorption plants and gas compressor stations, generating plants, steam plants, boiler plants, reservoirs, etc. All kinds of concrete and heavy construction. A staff of specialists and all modern facilities insure rapid and efficient service.



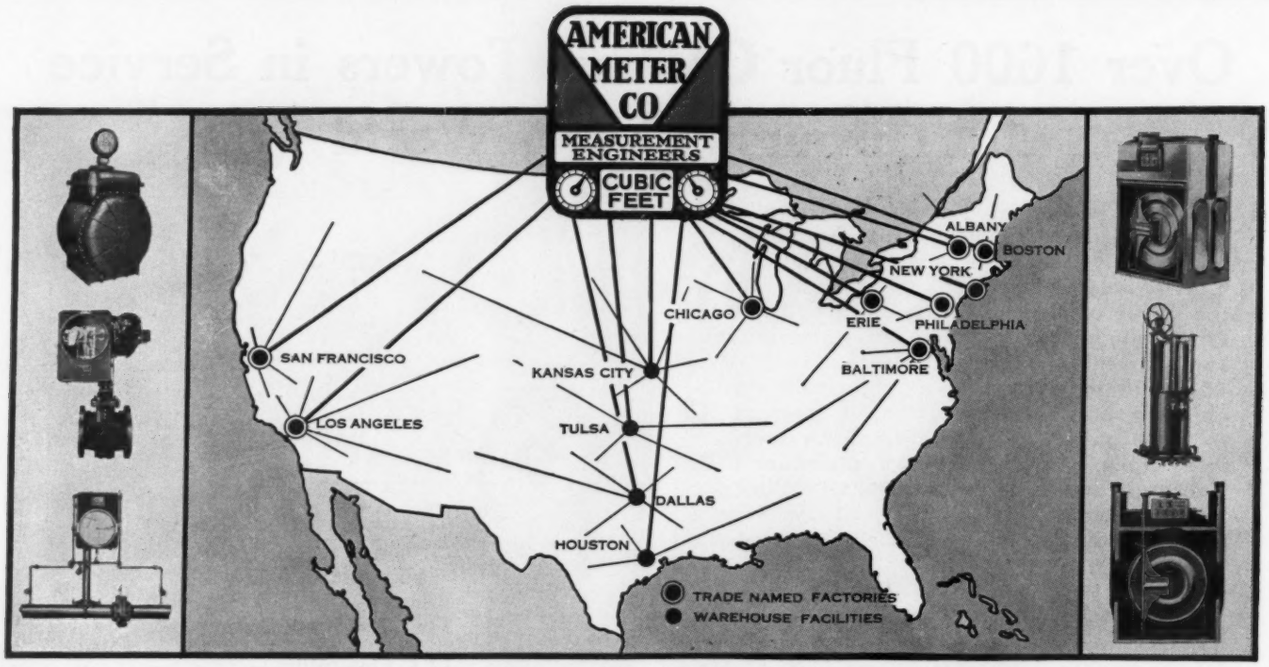
An inquiry to our nearest office will bring you full particulars.

THE Fluor CORPORATION, LTD.

909 East 59th St., Los Angeles, California

Tulsa, Okla.	New York, N. Y.	Dallas, Texas	Houston, Texas
National Bank of Commerce Bldg.	30 Church St.	Magnolia Bldg.	Second National Bank Bldg.

June, 1930, Volume VI, Number 6, WESTERN GAS is published by Western Business Papers, Inc., at 124 West Fourth Street, Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 3 years $5.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, California, under the Act of March 3, 1879.



Conveniently Located Factories

American Meter Company
New York
Established 1836

American Meter Company
Chicago
Established 1896

John J. Griffin & Company
Philadelphia
Established 1859

Haines & McIlhenny
Philadelphia
Established 1848

supported by nation-wide experience and facilities

Ninety-four years ago — shortly after the first gas plant was founded in this country — American Meter Company opened its first factory. Today American Meter Company supplies the gas industry from ten trade-named factories strategically located from coast to coast.

Each factory is an integral part of a comprehensive manufacturing organization, supervised by trained engineers. Each American Meter is made to the highest standards of accurate measurement and economical service.

Old Types Improved
New Types Developed

A pioneer in the manufacture of gas meters, American Meter Company is still pioneering in the development of improved gas measuring and testing apparatus.

With increasing experiment and intensive research, the engineers of American Meter Company are constantly improving established meters, and developing new equipment to meet new requirements.

Many Branches Provide Intensive Local Service

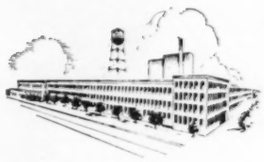
The geographical distribution of American Meter Company branches assures quick delivery and prompt engineering and shop service. It also permits an intensive knowledge of local conditions and their specific requirements.

Whenever you have a meter problem call in an American Meter Company representative. He will gladly bring to its solution a personal interest, supported by the experience of extensive laboratory experiment and of gas measurement practically applied in every part of the country.

"Gas Measurement Engineering," a periodic publication of American Meter Company will be of interest to you—also the complete index to this Company's other printed information. We will be pleased to place your name on our mailing list.

D. McDonald & Company
Albany
Established 1855

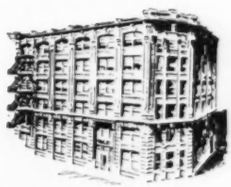
Maryland Meter Works
Baltimore
Established 1866



Metric Metal Works
Erie, Pa.
Established 1888

Pacific Meter Works
Los Angeles
Established 1903

Pacific Meter Works
San Francisco
Established 1901



Nathaniel Tufts Meter Works
Boston
Established 1860

AMERICAN METER CO
MEASUREMENT ENGINEERS
CUBIC FEET

AMERICAN METER COMPANY

Incorporated

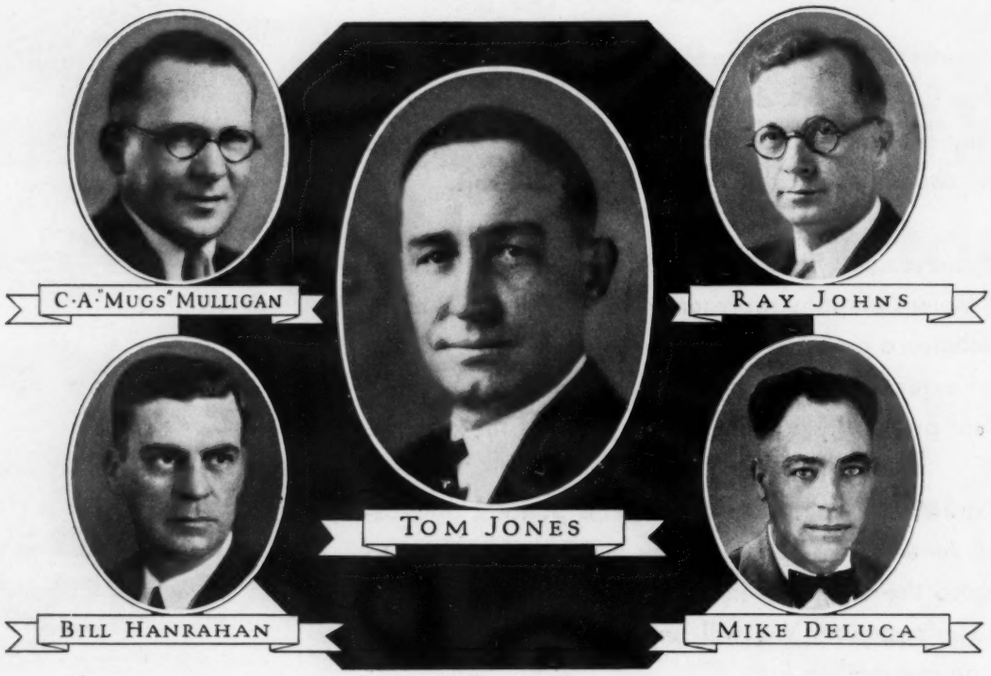
General Offices: 105 West 40th Street, New York, New York . . . . Established 1836

THE WORLD'S LARGEST MANUFACTURERS OF GAS METERS AND ALLIED APPARATUS

SALES ALBANY · BALTIMORE · BOSTON · CHICAGO · DALLAS · DENVER · ERIE · KANSAS CITY
SERVICE LOS ANGELES · NEW YORK · PHILADELPHIA · PITTSBURGH · SAN FRANCISCO · TULSA

ANNOUNCEMENT

TOM JONES—announces the reorganization and the expansion of the OKLAHOMA CONTRACTING COMPANY and takes pleasure in introducing his new associates



With a skilled organization and ample modern equipment, the *Oklahoma Contracting Company* can construct all sizes and any length of pipe lines . . . . anywhere.

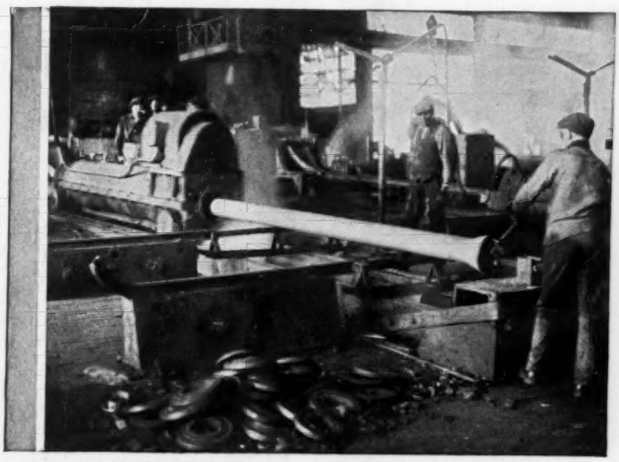
OKLAHOMA CONTRACTING CO.

PIPE LINE ENGINEERS AND CONTRACTORS

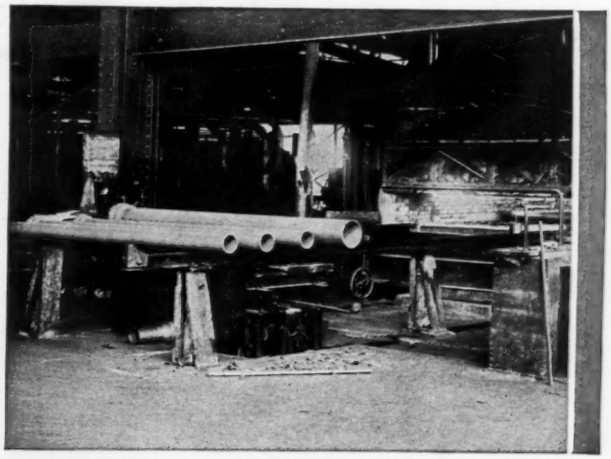
General Offices: Allen Building, Dallas, Texas

Branch Office: Oklahoma Gas Bldg., Tulsa, Okla.

centrifugal casting } *and* { controlled annealing..



As soon as the pipe is formed in the mold, the bell is secured by a locking device and the deLavaud machine moves slowly backward.



Immediately after coming from the machines, deLavaud pipe is placed in a furnace where accurately controlled heat uniformly anneals every length.

combine to give strength and flexibility to deLavaud pipe

THERE are two fundamental reasons for the strength and flexibility of deLavaud pipe metal. The first reason is the centrifugal method of casting in the water-jacketed deLavaud machine.

In this machine, the iron is cast under a pressure which drives out impurities with a force many times greater than gravity. This pressure brings about an unusually dense metal structure.

The cooling action of the water jacket also contributes to the strength of deLavaud pipe metal by breaking down and evenly distributing the non-ferrous particles.

The second reason for the strength and flexibility of deLavaud pipe is the controlled annealing process. Every length of deLavaud pipe is placed in an especially designed furnace, as shown at the upper right. Here, accurately controlled temperatures anneal every length from end to end, eliminating casting strains.

deLavaud pipe is made by modern methods to meet modern demands. Being light in weight, it is easy to handle. Easy to cut and tap. And, it offers at least 5% greater carrying capacity for the same outside diameter.

deLavaud pipe is manufactured in strict accordance with the specifications of the American Water Works Association and the American Gas Association as well as in the thicknesses and weights of the United States Government Specifications. The new deLavaud Handbook gives complete information. Write for your free copy today.

United States Pipe and Foundry Co., Burlington, N.J.

Our pipe bears the "Q-Check" trademark of The Cast Iron Pipe Research Association

Sales Offices: New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

A New House Service Regulator

Fisher Type 725

THE new FISHER Type No. 725 House Regulator has entirely new operating features found in no other regulator.

Cantalever operating spring has eliminated toggle levers, unnecessary pin joints, lost motion and friction.

The Type No. 725 is regularly furnished for initial pressures from 1 pound to 300 pounds, and with high pressure inlet adaptor can be furnished for still higher initial pressures. The Type No. 725 will hold a constant reduced pressure of inches of water even on widely varying initial pressures. The life of these regulators is long and service requirements are a minimum. You will want to include this regulator in your distribution systems.

Write for details.

FISHER

FISHER'S Complete Line

Steam Pump Governors
[10 to 1500 lbs.]
Boiler Feed Pumps
Fuel Oil Pumps
Vacuum Pumps
Receiver Tank Pumps
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electric and motor driven pumps
Reducing Valves, Pressure Regulators
for all pressures—liquids, gases, steam
Differential Pressure Regulators
Vacuum Regulators
Strainers
pipe, suction and drip pocket
Liquid Level Controls
direct and remote type
Lever Valves
air, gas, or liquid
Float Valves
Fluid Mixers
Hydraulically Operated Valves
Relief Valves
Back Pressure Valves
Steam Traps—Air Traps—
Gasoline Traps—Grease Traps
Exhaust Heads
Steam and Oil Separators
Drip Pockets
Vapor Pressure Controls
for oil storage tanks
Boiler Gas Fuel Regulators
Gas Engine Fuel Regulators
Automatic Gas Relief Valves
Gas Pressure Regulators
main and home service
Liquefied Petroleum Gas Regulators
for gas cylinders
Gas Water Traps

The FISHER Governor Co.

2400 Fisher Bldg.
Marshalltown
Iowa

FORGET
Weather and Pressure

Sturdy Mueller Service Clamps meet either condition

●

Weather and pressure conditions can get very severe but no matter what they are, there is a Mueller Service Clamp for every gas or water service need.

Read these five advantages:

1. These clamps are malleable galvanized iron and are made in a single and double strap pattern.
2. Clamp curvatures are extremely accurate to assure a close fit to the curve of the pipe.

G-10450
Tapped Iron Pipe Thread

G-10494
Tapped Corporation Stop Thread

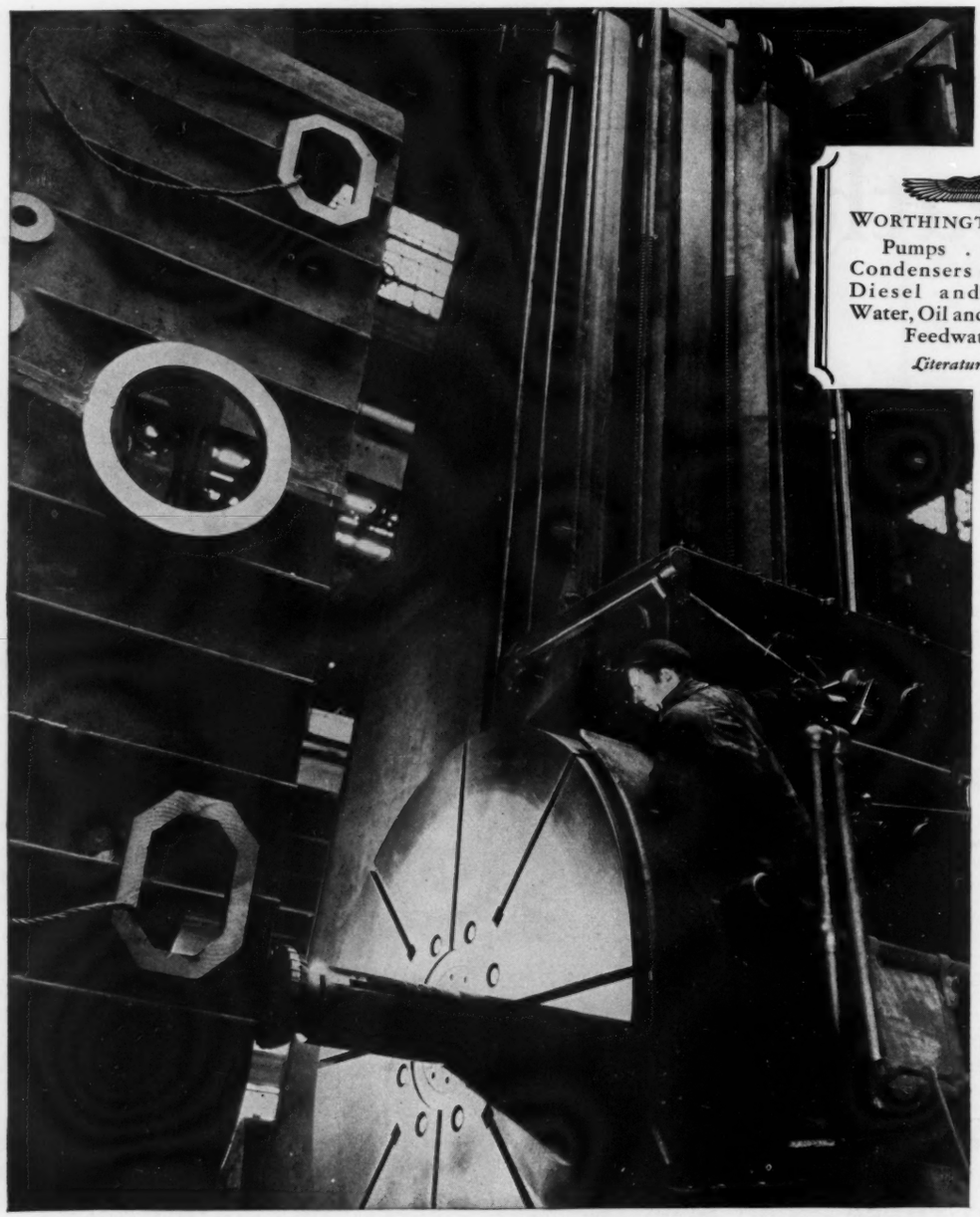
3. The boss on every Mueller Service Clamp is amply heavy to permit full depth of thread, which is tapped to template, thus assuring a good, sound joint.
4. All patterns of clamps are furnished with Mueller Patented Lead Ring Gaskets, which fit into a groove on the inner curve of the clamp.
5. All gaskets are molded with ears which are turned up over the edge of the clamps to hold gaskets in the proper position while the clamp is being placed on the main.

For ordinary conditions, the Single Strap Service Clamp is sufficient, but for severe climates, high pressure or large services, we advise the Double Strap.

Write for details and prices.

MUELLER CO., (Established 1857) Decatur, Illinois. **Branches:** New York, Dallas, Atlanta, San Francisco, Los Angeles, Chicago. **Canadian Factory:** MUELLER, Limited, Sarnia.

MUELLER



WORTHINGTON PRODUCTS
Pumps . Compressors
Condensers and Auxiliaries
Diesel and Gas Engines
Water, Oil and Gasoline Meters
Feedwater Heaters
Literature on Request

To be prepared to build . . . *within the scope of a definite field* . . . any piece of equipment required by Industry, no matter how large the machine or how exacting the requirements, is one of the objectives which Worthington has attained. Big units are constructed, in the Worthington shops, with surprising rapidity. Modern methods and adequate equipment make this possible. Such tools as the 19-foot vertical milling machine*, shown above, enable Worthington mechanics to fabricate gigantic castings with the same high degree of accuracy that prevails in the other steps of Worthington manufacture. To the user of Worthington-built products, it is a satisfaction to know that Worthington designing, universally recognized for its excellence, is backed up by exceptional manufacturing facilities in four extensive plants.

** Built from Worthington designs by The Bethlehem Steel Corporation*

WORTHINGTON PUMP AND MACHINERY CORPORATION

Works: Harrison, N. J. *Cincinnati, Ohio* *Buffalo, N. Y.* *Holyoke, Mass.*

General Offices: Harrison, N. J. . Executive Offices: 2 Park Ave., New York, N. Y.

G-38

WORTHINGTON

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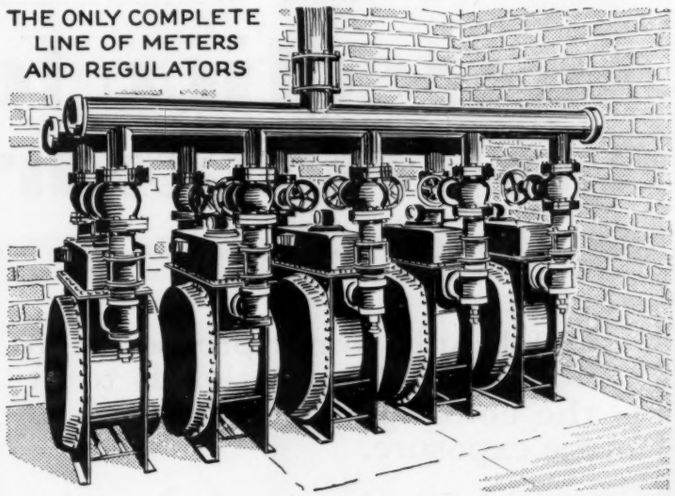
CHICAGO	DENVER	KANSAS CITY	PHILADELPHIA	SALT LAKE CITY	WASHINGTON

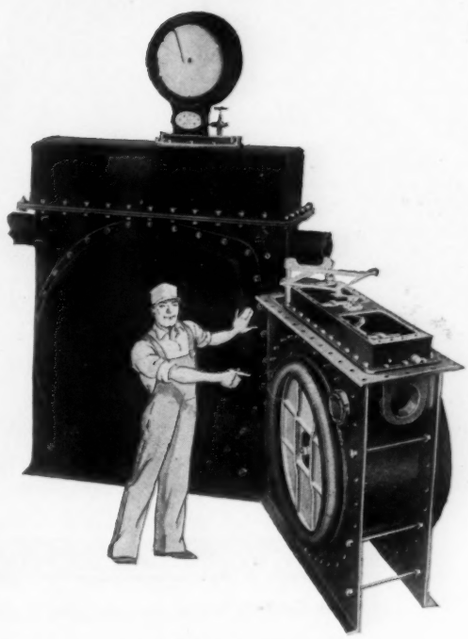
Branch Offices or Representatives in Principal Cities of all Foreign Countries



FOR INDUSTRIAL INSTALLATIONS -EMCO 5's

Requiring slightly over four square feet of floor space and just over three feet in height, the compactness of this meter is greatly appreciated for manifold installations. The entire assembly weighs approximately 900 pounds.

The pressed steel case construction; Rolling type diaphragms, mounted on terne iron pans reinforced to maintain absolute rigidity; Diaphragm drains; Patented tangent adjustment; Flag rod and movement so mounted to eliminate friction; Exclusive valve arrangement; Interchangeability of all parts; Moving parts cadmium plated; these features combine to produce a meter that will measure accurately 10,000 cu. ft. of gas per hour with a pressure drop of less than two inches of water.



EMCO PRINCIPLES

Rolling Type Diaphragm - All Parts Interchangeable
Steel Case - Rugged Beyond Compare
Easily Repaired - In The Line

EMCO METERS AND REGULATORS

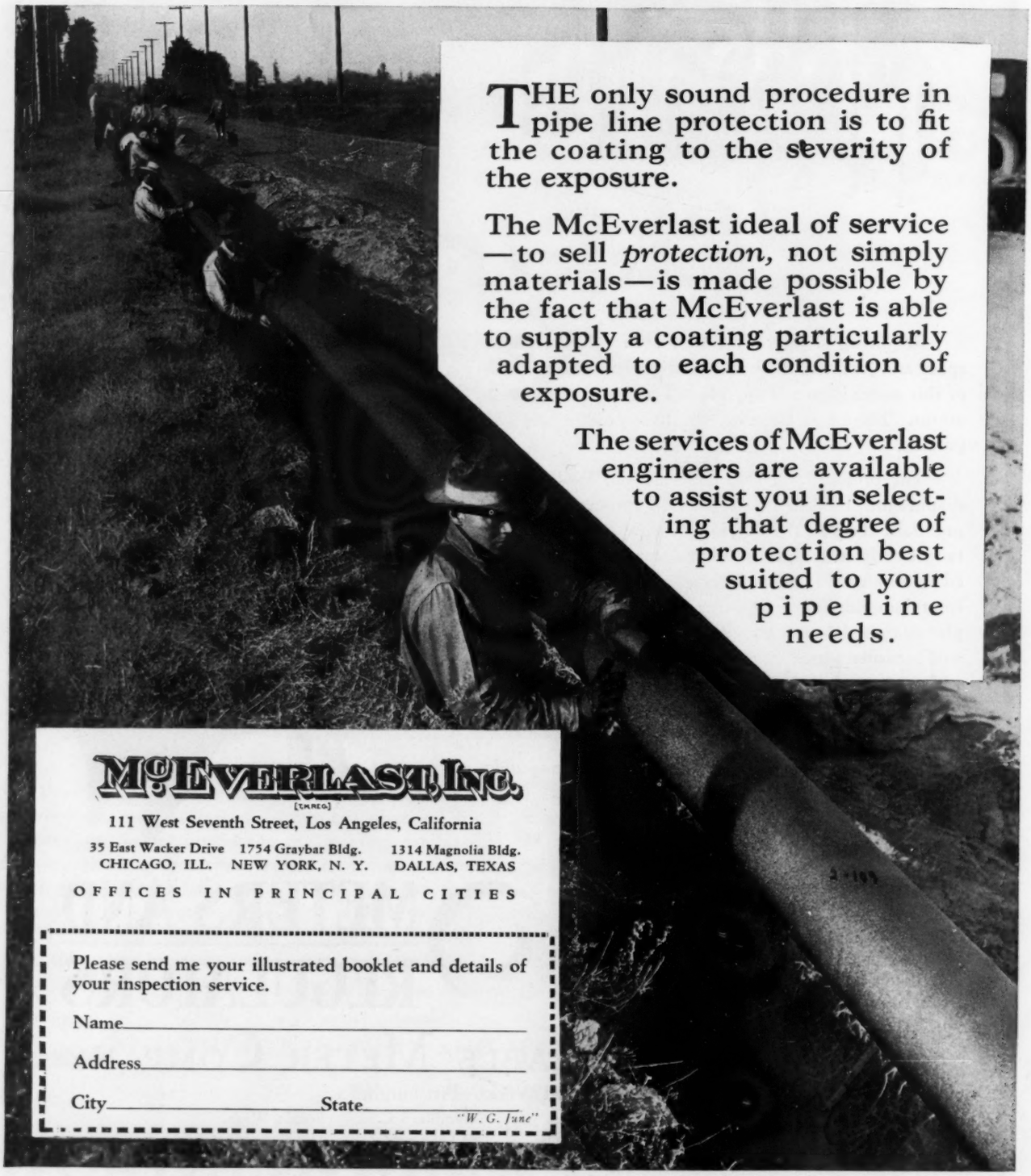
PITTSBURGH EQUITABLE METER COMPANY

Main Office and Works—Pittsburgh, Pa.

New York City, Chicago, Ill., Los Angeles, Calif., Tulsa, Okla., Dallas, Texas, Columbia, S. C., Salt Lake City, Kansas City, Mo., Seattle, Wash., Houston, Texas

McEVERLAST

Pipe Line Protection for Every Condition of Exposure



THE only sound procedure in pipe line protection is to fit the coating to the severity of the exposure.

The McEverlast ideal of service—to sell *protection,* not simply materials—is made possible by the fact that McEverlast is able to supply a coating particularly adapted to each condition of exposure.

The services of McEverlast engineers are available to assist you in selecting that degree of protection best suited to your pipe line needs.

McEVERLAST, INC.
[THREE]

111 West Seventh Street, Los Angeles, California

35 East Wacker Drive, CHICAGO, ILL. 1754 Graybar Bldg., NEW YORK, N. Y. 1314 Magnolia Bldg., DALLAS, TEXAS

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Please send me your illustrated booklet and details of your inspection service.

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"W. G. June"

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West Coast Builder

Since September, 1929!

IN only a little over six months, more than one thousand contractors and builders have PAID to receive *West Coast Builder*. This number, in addition to the regular circulation built up in the past ten years, gives this journal a representative coverage in the entire Pacific Coast Area and—NEW SUBSCRIPTIONS CONTINUE TO COME IN at the rate of approximately 100 PER MONTH!

NOT an astounding increase, perhaps, but a definite and consistent indication of Reader Acceptance—the true gauge of an advertising medium's value.

IS your sales message being effectively "hammered home" to this ever-increasing number of real live prospects whose annual buying power runs into the millions? Will your products be used by these builders in the thousands of new homes and buildings they will erect here in the West during 1930?

***West Coast Builder* can be of definite assistance to you in building up and holding this important market. We'll be glad to give you more details on request, and to cooperate with you in every way possible.**

WEST COAST BUILDER

124 W. 4th Street **Los Angeles, Calif.**

Naylor Pipe Automatically Provides For Expansion and Contraction▲

EXPANSION and contraction of pipe lines is often a serious problem with standard wrought pipe. Expansion joints are often necessary, thus adding materially to the cost of the line.

Naylor Pipe automatically provides for expansion and contraction within the structure of the pipe itself. The spiral lock-seam truss acts as a continuous expansion joint---automatically relieving the stresses and strains that would ordinarily be set up by changes in temperature.

With Naylor Pipe, it is therefore possible to lay the whole line without expansion joints of any kind---with the assurance that expansion and contraction will be taken care of without strain or damage to the pipe.

Use Naylor Pipe *exclusively.*

A 16-inch Naylor Pipe line, 30 foot joints, Victaulic coupled, laid on desert in West Texas. Note the absence of expansion joints.

NAYLOR PIPE COMPANY, Main Office & Plant, 1230 E. 92nd St., CHICAGO

SALES OFFICES

3116 Chrysler Building, New York
Witherspoon Bldg., Philadelphia
1209 First National Bank Bldg., Pittsburgh
507 Philtower Bldg., Tulsa
601 Post-Dispatch Bldg., Houston

MONTREAL, CANADA---Mechanical Equipment Co., 660 St. Catherine St., West

TONCAN COPPER

Naylor Pipe

Maximum Structural Strength Mo-lyb-den-um IRON With Minimum Weight

Standardized Naylor Pipe is made in sizes 6" to 12" I.D. and 14" to 20" O.D. in any uniform length desired up to 40' 0". Ends made to wrought pipe standards for all types of coupling.

Where corrosion is not a problem, Naylor Pipe can be furnished in steel.

Toncan Copper Molybdenum Iron possesses a superior corrosion resistance, making it the favored pipe material.

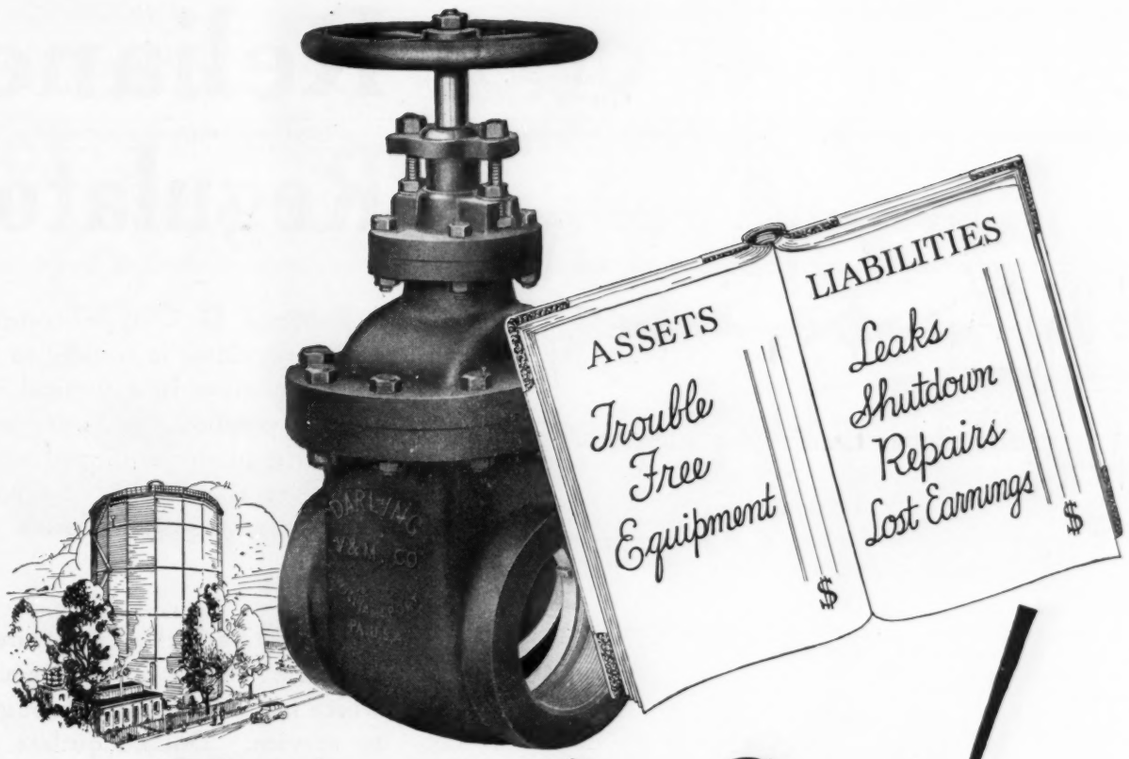


Figure the Cost!

THE valves you put into your line are either with you or against you. They either reduce operating expense or eat up profits. Many a company is on the wrong side of the ledger because it has failed to take into account the difference in valves as well as other equipment.

Consider the design of Darling Gate Valves as compared with others constructed along more conventional lines. Examine the parts and note how rugged and simple they are. You will observe that Darlings seat tightly with scarcely any friction or wear. The discs revolve, seating at a different place each time.

Write for further description.

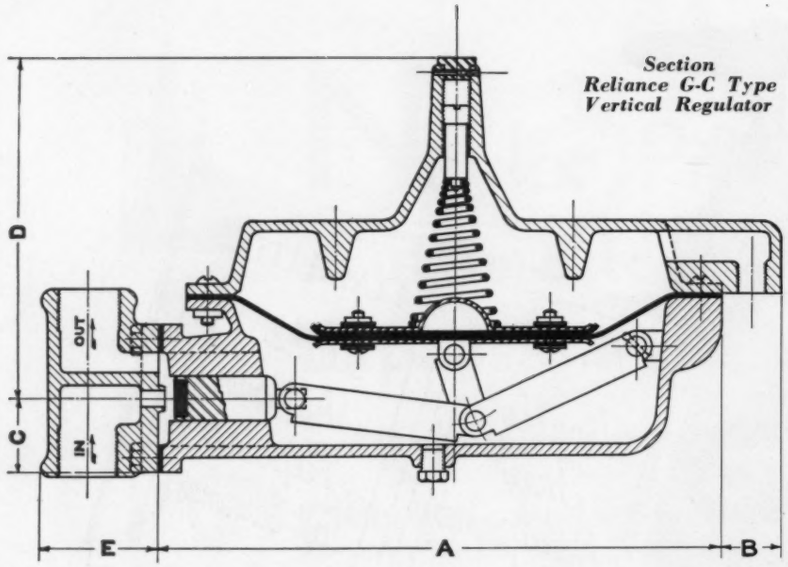
DARLING VALVE & MFG. CO.

WILLIAMSPORT, PA.

New York Oklahoma City Houston

DARLING

GATE VALVES

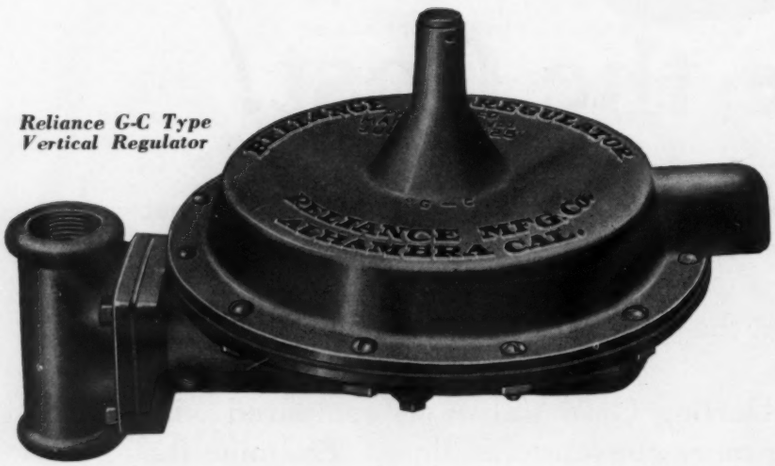


Section
Reliance G-C Type
Vertical Regulator

Reliance Regulators

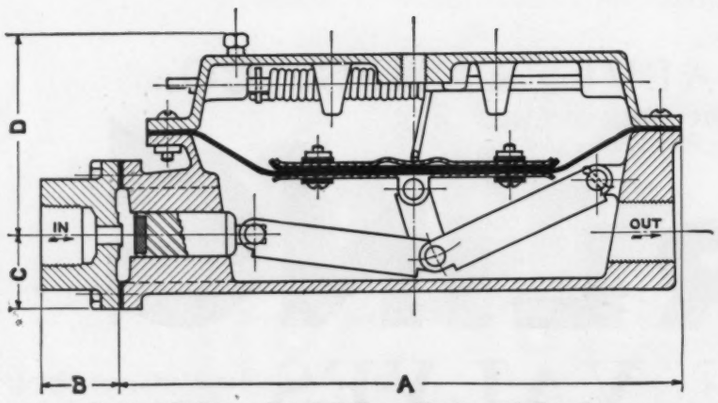
Reliance G C type compression spring regulator is equally as flexible for installation in a vertical or horizontal position as our standard G-type regulator equipped with horizontal spring. The sealing plug eliminates tampering with adjustment.

A positive lockup is assured with Reliance toggle action mechanism which has been proven through years of service. Double outlets can be provided in either type, which when tied together increase the capacity 60% over single outlet connection.



Reliance G-C Type
Vertical Regulator

The valve orifice casting can be removed by taking out the four cap screws and the valve seat is then accessible for inspection. Another feature in this respect is that orifice valves can be changed in size in event inlet operating pressures should change. A 7/16″ orifice is recommended for inlet pressures under ten pounds; from ten to thirty pounds the 5/16″ orifice and for any higher pressure the 3/16″ orifice.



Section Reliance No. 1-G Type Horizontal Regulator

Reliance Manufacturing Co.

1000 Meridian Ave., Alhambra, Cal.

Isbell-Porter Co., Newark, N. J.; Westcott & Greis, Inc.; Tulsa, Okla.; Dallas, Texas; Houston, Texas; Birmingham, Ala.; N. W. Gas & Electric Equipment Co., Portland, Oregon.

Tests prove ATWOOD "Interlock" Neck

"*stronger* than the pipe itself"

HEADER INSTALLED IN GAS COMPRESSOR STATION, STERLINGTON, LA.
A PRACTICAL APPLICATION OF THE "INTERLOCK" WELDED NECK

Fabricated for Henry L. Doherty & Co., Engineers for Republic Construction, Monroe, La., 400 lb. working pressure. 20" O. D. x ½" L. W. Pipe, 16" and 8" ATWOOD "Interlock" Necks.

TESTS recently conducted by the Pittsburgh Testing Laboratories to determine the mechanical strength (without welding) of the "Interlock" principle as well as the strength of the neck Oxyacetylene welded, conclusively prove the ATWOOD "Interlock" Welded Neck is actually "*stronger* than the pipe itself."

The ATWOOD "Interlock" Neck has been developed to meet the extreme conditions of modern high pressure lines. Its principle has been applied successfully to welded headers for every service condition . . . power plant, compressor station, refinery, river crossing, steamboat, and industrial piping generally where pressure and temperature are involved. Among the many hundreds of installations during twenty years . . . there *has not been a single failure.*

The Test

DESCRIPTION OF TEST . . . *On top of a 600,000 pound test machine two saddles . . . cut, of course, to conform with its surface . . . were set on 13 3/16" centers to support the 10" pipe. The 3" pipe was gripped by jaws in the lower head and tension applied.*

MATERIAL . . . *Seamless Steel Pipe in accordance with A. S. T. M. Specification A-106-29, Grade A. 10" Pipe, 10¾" O. D. .531 thick and 3" Pipe 3½" O. D. .312 thick.*

RESULTS . . . *Specimen No. 1 . . . "Interlock" Neck, no welding—Pipe failed at 63,200 pounds.*

Specimen No. 2—With Oxyacetylene Weld—At load of 145,850 pounds, the 3" pipe failed at a distance of 9½" beyond the outside of the 10" pipe. NO FAILURE OF THE WELD WAS NOTICEABLE.

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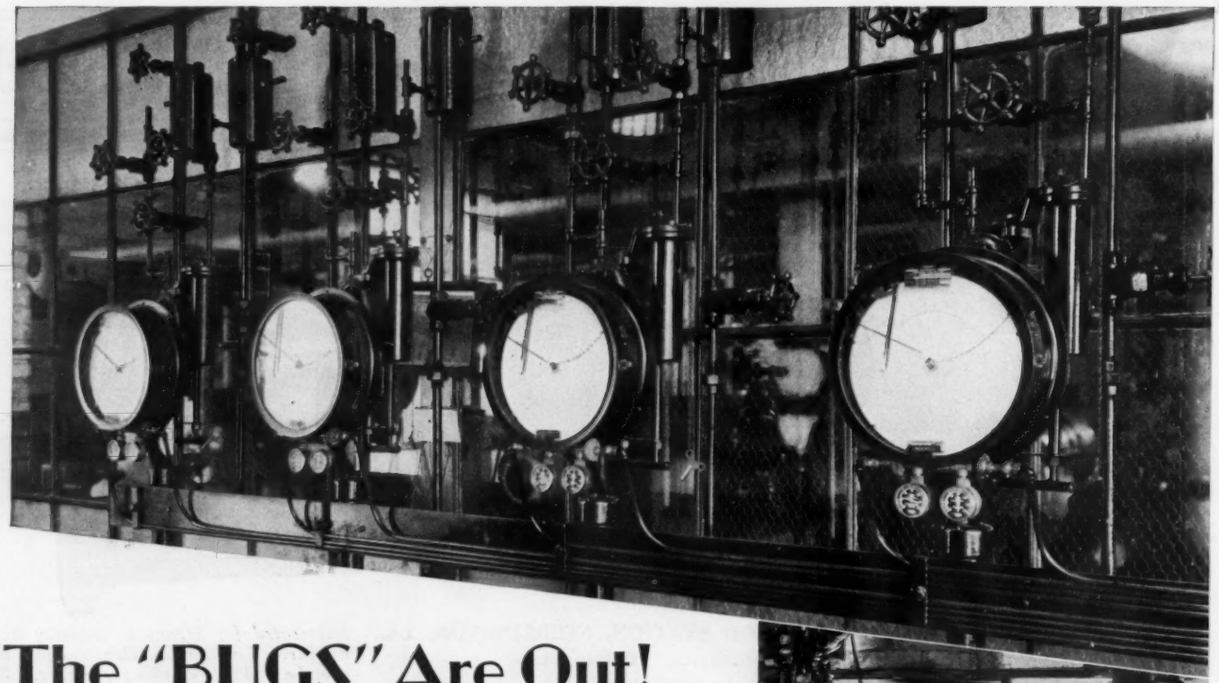

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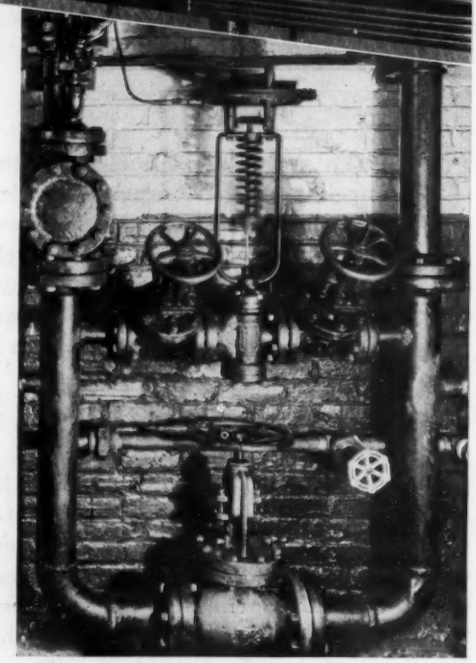

A few of the many Foxboro Flow Controllers used by one of the large Eastern Refineries—and one of the V-Port Controlled Valves.

On one refinery process Flow controllers tripled production.

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IT is a costly job to lay several lines of pipe across a stream—costly in time, labor, and extra material and equipment involved. Experienced engineers know just where to begin in making certain that the investment will be properly safeguarded. They first make sure of the right pipe—knowing that this is the foundation of successful submerged pipe lines.

The photograph above shows one of the crossings of a 200 mile, 18-inch, NATIONAL Pipe line. Laying of this line involved crossing the Mississippi and four other rivers in addition to swamps, stretches of gumbo, etc.—a job requiring sound engineering practice and reliable materials.

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A Monthly Journal of the Gas and Gas Appliance Industries in *Western America*

SAN FRANCISCO **LOS ANGELES** **DALLAS**

Widening Natural Gas Service Area *on the* Pacific Coast

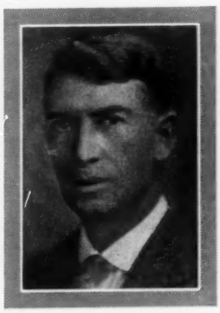
By W. S. YARD

Vice-President in Charge, Gas Construction and Operation Pacific Gas and Electric Company

THE past year has been one of great activity in the natural gas business in California; the potential production was greatly increased, new fields were further developed at great distances from the older fields, thus providing a supply for a greater portion of the State than at any time previous.

Sixty-five per cent of the State's consumers are using natural gas and upon completion of many miles of new transmission lines now under way 95 per cent of the consumers will be using it, which will eliminate a great portion of the current wastage.

The outstanding event of the year 1929 in this industry in California was the commencement by the Pacific Gas and Electric Company, in August, of the transportation of natural gas from the Kettleman Hills oil and gas field to San Francisco, Oakland, San Jose and other cities and towns in that section of the State which never before had had the advantages afforded by its use. This marked a new era of industrial development in this territory, as evidenced by the fact that already a great many old established industries have changed over to this fuel. A second line is about completed which will transport gas from the same field to the northern part of the State. When the proposed lines are completed natural gas will be served from San Clemente, which is 60 miles south of Los Angeles, to Roseville, located 80 miles northwest of San Francisco, a distance between these points of approximately 450 miles, all within the State, which will be connected from end to end, although being the property of several companies.



W. S. Yard

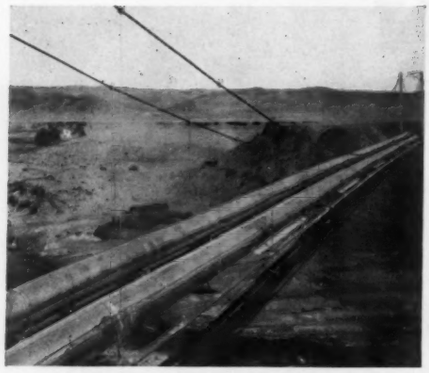
OVER the period of slightly more than a year natural gas has doubled its scope in California, and signs of beginning to feel the effects of natural gas marketing activity are also to be observed in other sections of the Pacific Coast. In his paper prepared for the program of the Natural Gas Department convention last month, Mr. Yard gives an over-all view of these developments. R. E. Fisher, vice-president in charge of public relations and sales for the Pacific Gas and Electric Company, read Mr. Yard's paper before the New Orleans meeting.—*Editor.*

Another interesting development of the past year was the entering into the public utility business of the Standard Oil Company of California through its purchase of control of Pacific Public Service Company, of which the Coast Counties Gas and Electric Company is a subsidiary and a distributor of gas. Since the Standard Oil Company of California owns in fee approximately 50 per cent of the Kettleman Hills area, where the developments to date have indicated an enormous potential natural gas production, the operation of the gas companies it purchased will give it an outlet for a large volume of its own gas.

Although there is a surplus of gas in the fields in the southern part of the State at the present time this surplus will undoubtedly be reduced due to conservation measures and natural decline. In order to augment its supply for Los Angeles and vicinity in the future the Southern California Gas Company has laid 70 miles of line south from the Kettleman Hills tying in with its system from the Midway Sunset fields to the southern city. This line is also aiding in the conservation of gas.

In changing from a manufactured gas with a heating value of 550 B.t.u. to natural gas with a content of 1170 B.t.u. per cubic foot the companies in northern California were confronted with the same problems others had faced before. The Pacific Gas and Electric Company organized a complete new department to take care of the huge task of converting from manufactured to natural gas.

Over 800 men were hired and trained so as to be familiar with all makes of apparatus in order to know how to make them suitable for burning natural gas. These men were divided into groups known as utilization crews, each crew being in charge of a manager, and the men all wearing khaki uniforms with the company name on them. Notices were sent to consumers in a certain district three or four days before natural



FROM TOP TO BOTTOM the above views show:

1. Pacific Gas and Electric Company natural gas line at the Panoche Creek crossing.

2. Lining up 26-inch pipe on the Stanpac line, which traverses central San Joaquin Valley. P. G. and E. and Standard Oil Company of Calif. interests are combined in this line.

3. Where the 16-inch branch from the Stanpac line (to serve Stockton, Sacramento, Modesto, and other Valley towns) crosses the San Joaquin River.

4. Section of Kettleman Hills $1,000,000 compressor plant on the original P. G. and E. gas line.

gas was turned into the mains when the crews of adjusters went their rounds. Trucks loaded with orifices and other appliance parts went along with the crews to supply them with whatever they needed.

There are 48 oil fields in California, all being located in the southern half of the State; of these 36 produce amounts of gas worth considering. The major fields are Santa Fe Springs, Long Beach, Huntington Beach, Ventura, Midway-Sunset, Kettleman Hills and Elwood. Table No. 1, covering the month of January, 1930, shows the production from each of these major fields, the combined production from the other 30 fields, and the total for the State. It also shows the amount stored and used for re-pressuring, the amount sold to gas companies and the quantity wasted. Figures for quantities used for various purposes in the field, plant shrinkage, etc., are not included.

In several fields attempts are being made to conserve the gas by re-pressuring old wells or storing the gas. By referring to the table it will be noted that about 25 per cent of the gas stored is in the Santa Fe Springs field. There they have a depleted oil sand, the Meyer Zone, in which it is possible to store large quantities of gas at low pressures. In the Midway-Sunset field the gas is being stored in a sand from which large volumes of dry natural gas have been taken in the past.

In the Kettleman Hills a hole was drilled into a dry sand located considerably above the producing horizon. Attempts are being made to store gas in this well, but it will be noted that the quantity put in amounted to less than a million cubic feet per day.

Twenty-seven per cent of the gas produced was sold to gas utilities for transportation to and distribution in cities and towns, whereas the amount blown to the air during that month was 43 per cent of the production. It is this enormous waste of almost 23 billion cubic feet per month or 760 million cubic feet per day that has caused the great interest shown and the effort of the State officials, major oil companies and gas companies to reduce this loss. The value of this wasted gas is approximately $2,000,000 per month at the present time. Only dry gas is wasted, however, as all production in the State containing gasoline is treated in absorption plants, the yield for the month in question being about 70,000,000 gallons for the 139 plants operating.

Since the natural gas delivered in California has no odor it has been the decision of all the utilities in the state to inject a liquid volatile at pressures up to 250 pounds and at temperatures as low as 55 degrees F. into the transmission or distribution mains. Among its various requirements, the odorant must be non-toxic, and not nauseating; and with one per cent of gas in a room there should be a strong odor. As the lowest limit of explosibility of natural gas in air is 4.4 per cent this gives a factor of safety of 4. The odorant used, a by-product of crude oil, is injected into the gas at the rate of from 3½ to 5 gallons per million cubic feet of gas transported.

The results of putting the odorant into the gas are not noticed until three or four days after it is first put in the lines. At first the number of complaints increased to as high as 10 times the number recorded before the injection of the liquid, these complaints being reduced until under normal operating conditions they average about five times the number reported before any odorant was used.

Another branch of the business that is expanding rapidly in the state is the distribution of bottled gas to consumers who live in areas not reached by the gas pipe-lines. Four companies have entered this field to date. Twelve thousand consumers are being served with this gas today, and since this business has just started it is expected it will grow rapidly and that possibly 20,000 consumers will be added this year.

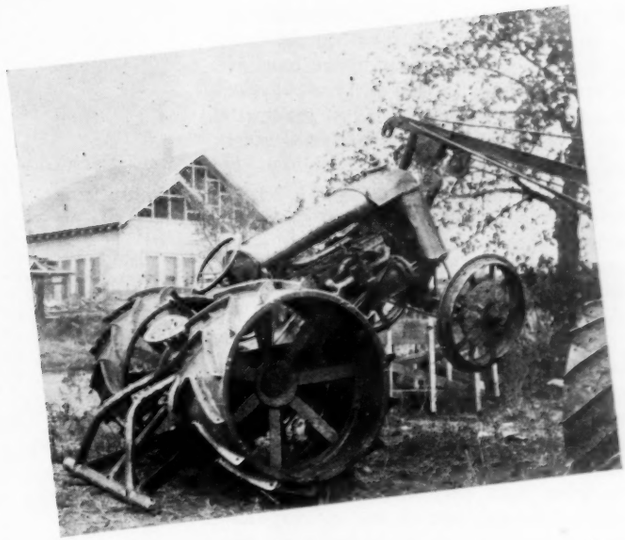
(Continued on Page 54)

TABLE NO. 1. CALIFORNIA NATURAL GAS STATISTICS FOR MONTH OF JANUARY 1930

All figures in thousands of cubic feet

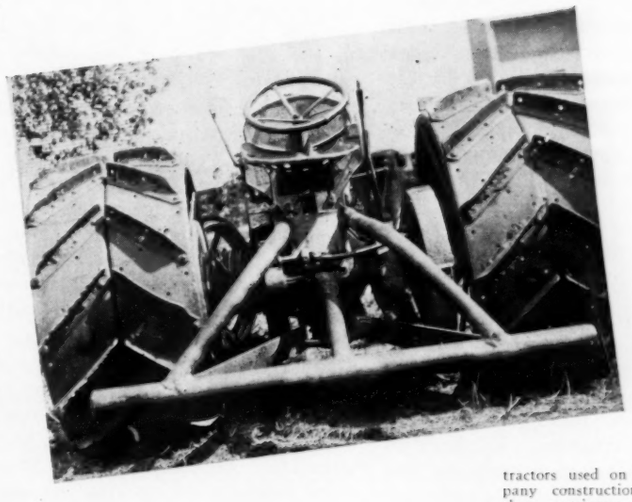
Field	Production	Repressuring and Storage	Sold to Gas Companies	Wasted to Atmosphere
Huntington Beach	1,098,000	64,000	239,000	16,000
Long Beach	7,456,000	0	2,410,000	1,284,000
Santa Fe Springs	18,749,000	250,000	2,367,000	12,096,000
Ventura	5,545,000	0	3,533,000	775,000
Kettleman Hills	10,868,000	23,000	2,228,000	7,789,000
Midway-Sunset	2,152,000	51,000	777,000	168,000
30 Other Fields	744,000	0	133,000	436,000
TOTAL	46,612,000	388,000	11,687,000	22,564,000
Daily Average	1,500,000	12,500	377,000	728,000

SAFETY *in* Pipe Line Construction



By ALBERT W. BREELAND

Safety Supervisor
*Lone Star Gas Company, Dallas, Texas**



ABOVE: Illustrating how one of the hazards encountered in pipe line construction has been overcome. This tractor cannot "buck," because of the guard.

AT LEFT: This view shows detail of tractor guard construction. Wheel-type tractors used on Lone Star Gas Company construction are equipped with these outriggers, which prevent them from reaching the overbalancing point.

IT is only during the past few years that any organized effort has been made to control accidents in the pipe line industry and this has been done principally by the larger companies. Today the list of companies in the oil and gas industry which are actively engaged in accident prevention work is constantly growing.

A. W. Breeland

Because not all of the companies in the industry have made, as yet, any organized effort to prevent accidents, it was deemed advisable for this discussion to attempt to cover every piece of equipment and each operation that would be most likely to cause an accident. Although this paper will deal principally with welded pipe lines, the general principles apply to all pipe lines.

Accident prevention work in modern pipe line construction, not unlike modern pipe line construction itself, must be well organized and properly executed to be effective. To begin with, the management must be thoroughly convinced that accident prevention pays substantial dividends, not only from a humanitarian, but also from a financial standpoint, and must give its unqualified support in the work.

Next in line, I should say, is the safety supervisor, who must be honest, sincere, and enthusiastic about the work. I might elaborate upon the safety man's qualifications, but I do not believe they can be covered more fully than in those three words—honesty, sincerity, and enthusiasm.

If any degree of success is to be attained in accident prevention work, the superintendent must believe in safety. He must not only believe in it, but by his actions, he must let his attitude be known to his subordinates. He must insist on all reasonable safeguards being installed and all reasonable safety suggestions being complied with. When a superintendent is so interested in accident prevention work his attitude will invariably be reflected in the conduct of his subordinates; for this reason his support is of utmost importance in accident prevention work. Without his unqualified support our task will be much harder.

Next to the superintendent is the foreman. Many safety men and executives are fully convinced that the foreman is the man upon whose shoulders rests the greatest responsibility for controlling accidents, as it is the foreman who directs the individual efforts of the men. Safety rules and regulations are useless if not enforced, and it is the foreman who must see that these rules are enforced. In my company our foremen are taught that accident prevention work is just as much a part of their job as laying and operating pipe lines, and I am glad to say that without exception

*Read at the Second Annual Southwestern Safety Congress, Dallas, Texas, April 25, 1930. Acknowledgment is made of the very valuable information furnished by R. Vandercook, superintendent of pipe lines of Lone Star Gas Company, and Luther Tolbert, assistant superintendent of pipe lines of Lone Star Gas Company.

they treat it as a definite responsibility.

In selecting the workers or the manpower for the organization we have another problem to solve. If a physical examination of all men is made the problem is greatly simplified, particularly so since the important, although laborious, task of selecting men is not left up to the superintendent or foreman, who are not qualified to pass upon a man's physical fitness for any particular work except from appearances, but to the examining physician. It is among the workers that 99 per cent of accidents occur, and it is for this reason that I cannot stress too strongly the importance of a thorough physical examination of all men engaged in pipe line construction. In my company we have been examining men only about nine months, and although that is not a very long period from which to draw conclusions, from our experience during that time I am thoroughly convinced that a physical examination of all employees is a financial success. This is true not only from the standpoint of reducing the accident potential by eliminating men who are physically unfit for such work, but also from the standpoint of increased efficiency, resulting from the employment of men who are physically suited for such work.

BEFORE:

Transportation of crews to construction jobs has its hazards, especially when unprotected trucks with platform bodies such as the one illustrated at the right are used. See the view on opposite page for the remedy.

DEFECTS WHICH DISQUALIFY

Among the defects for which men are disqualified by our company physician are hernia, potential hernia, varicocele, hydrocele, hemorrhoids, high blood pressure, heart trouble, tuberculosis, venereal diseases, defective sight, hearing and general physical condition. We have no definite age limit but depend on the judgment of the doctor as to whether or not the man is qualified for the job. We believe that many men at 45 or 50 are physically more able bodied than others at 30 or 35. It is for this reason that we have left the age limit of each man to the judgment of the doctor.

In our organization approximately 25 per cent of all men examined have been rejected.

In examining men we believe it more satisfactory to have the examinations made by our own staff physician, than by local private physicians—for several reasons, some of which are as follows:

The company physician is more likely to give a thorough examination than the local physician. From his contact with the oil and gas industry he usually has a better knowledge of what the physical requirements are, and he is not subjected to the temptation of being lenient with the local men, many of whom the local doctor, no doubt, serves as family physician.

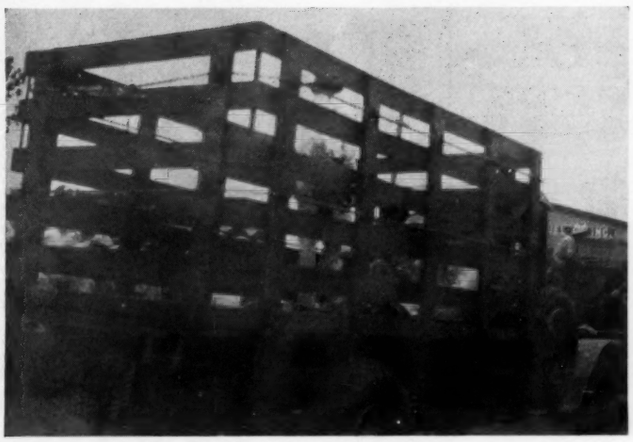
Furthermore, the company physician is nearly always on hand to render first aid and care for the injured when an accident occurs. By having our doctor on the job, we have eliminated many small doctor and medical bills.

The qualifications of a physician for this type of work, in addition to his training and experience, should be—honesty, sincerity, sympathy, enthusiasm and a good knowledge of human nature. We feel that the success of our own physician has been due in a large measure to his ability to get and maintain the confidence of the foremen and workmen.

It is obvious, of course, that high grade equipment is absolutely essential in successful pipe line construction. It is also a factor that must be considered in accident prevention in pipe line construction. Equipment that is manufactured without taking into consideration all practical safeguards should not be used if other equipment can be secured. If it is not possible to enlist the aid of the manufacturer in providing reasonable safeguards, the company should provide them. I believe that if sufficient pressure were brought to bear upon manufacturers of equipment used in pipe line construction, many of the safeguards which it is now necessary to install in the field or shop would be built and installed in the factory at little or no extra cost.

TRANSPORTATION HAZARDS

In modern pipe line construction the motor truck plays one of the most important parts. It is used for stringing pipe, hauling material necessary for pipe line construction, and for the transportation of men to and from work. There are certain hazards connected with the transportation of pipe and other materials. The majority of these, however, are due to the human element rather than to the failure of equipment or to the lack of proper safeguards and will be discussed elsewhere in this paper. It is in the transportation of men to and from the job that our greatest hazard exists. Picture, if you please, a truck with a platform body going along the highway or over rough roads with 30 or 40 men sitting on the bed with feet and legs hanging over the sides and end, and it will not be very difficult to imagine what could happen if a passing car should get too near or should skid into the side of the truck, or if the truck bounces over rough spots at a fairly good speed. What chance has a man to protect himself under such circumstances? None! We have learned from bitter experience what can result from such an unsafe method of transportation of employees. To overcome this hazard we built a frame truck body approximately 4½ feet high, with an end gate of the same height, boomed at the top and about 12 inches from the bottom with two electrically welded steel chains, very similar to those used in booming pipe. This frame, better known as the "Bull Pen," is collapsible and is easily removed when the truck is needed for hauling material that cannot be conveniently handled with this type body. To load and unload the men, the end gate is removed. When the first body was installed it was pointed out by some of our men that it would greatly decrease the utility of the truck, but on the contrary, it was found that for practically all material with the exception of pipe, it greatly increased the utility and load efficiency of the truck. On welded lines I have seen a truck with a normal load of oxygen and acetylene bottles topped off with a load of hay and feed stuff for the skinners' teams or a load of rubber for making fire bends; sometimes both. The results have been so gratifying that



AFTER:

This collapsible frame, to be mounted on a platform truck body when transporting workmen, is officially known as the "bull pen." It not only saves accidents, but also is highly useful for trucking miscellaneous loads.

practically all trucks used in this class of work are now equipped with this type of body. Before these bodies were installed accidents were common occurrences and during the past two years two accidents, both resulting from cars and trucks being sideswiped, forcefully impressed upon us the need of a remedy. One of the accidents cost a man the use of both legs and practically the loss of his mind, while the other cost the injured the loss of one leg just below the thigh. I am glad to say that accidents from this source have been practically eliminated.

TRACTOR HAZARDS OVERCOME

A very important piece of equipment in pipe line construction is the tractor. A wheel-type tractor which my company had used exclusively until about two years ago, was the cause of many accidents, including three fatalties. The greatest danger in the use of this type tractor was from kicking over or bucking which resulted usually from gunning the motor too rapidly when changing from high to low gear while making a hard pull up an incline or occasionally on level ground. To eliminate this hazard an outrigger or guard was designed which prevents the tractor from reaching the overbalancing point. It was claimed by some critics that this device would prevent a tractor from going up steep inclines or crossing wide ditches, as the tail would drag when the front wheels were approximately 24 inches above the level of the rear wheels, but climbing steep inclines is one practice we try to avoid and this device greatly aids in preventing it. Two fatalities resulted from the drivers' attempting to drive their tractors up short steep inclines. As to crossing wide ditches, this occurs so infrequently that the loss of efficiency is practically negligible. We believe that with the aid of this guard, we shall have no more accidents from this source.

During the last two years, however, we have purchased only the heavy caterpillar type tractor. We have found this type of equipment to be far superior to the wheel type equipment for pipe line construction. It will not only do more heavy work but also eliminates the hazard of tractors kicking over.

Air compressors play a very important part in pipe line construction, since they are used in testing the line before it is placed in the ditch and in drilling rock for blasting. Very fortunately, compressors of standard manufacture are built to standard codes and defective equipment is rare. All receiving tanks on compressors should be equipped with safety valves, adjusted to pop in sufficient time to still leave a good factor of safety. All equipment such as stop cocks, connections, and hose should be of such quality as to handle the required pressure safely.

Probably the most important equipment as far as pipe line construction is concerned is the ditching machine, without which laying a pipe line would be a very slow and expensive proposition. The hazards connected with this important machine are relatively few; at least our experience has proven so. However, the life of some of the moving parts of the machinery could be materially lengthened by being completely enclosed in metal guards, which would also eliminate practically the only existing hazards in connection with this equipment.

In addition to the machinery it is also necessary to have a large supply of picks, shovels, sledges, hammers, rock drills, and various other small tools, all of which should be kept in first class condition. A well equipped blacksmith shop should be on the job to keep such tools in repair. Very few serious accidents result from the use of good hand tools.

Next, we shall discuss the actual work. The first work to be done after the survey has been made is clearing the right-of-way. While the average person does not associate very many hazards with this part of the work, there are a number of hazards peculiar to this operation which should be considered. First of all is the danger of ivy poisoning, especially in the spring and summer, and I might say here that we have had several cases, some of which disabled the victims for weeks. Practically the only safeguard against this hazard is to caution the men to handle all ivy or vines of a similar variety in such a manner that the vines will not come in contact with the naked skin. This does not always prevent the poison, however, as some men can walk through the forest and get it. Some of our men have tried a serum which is supposed to render a man immune from this poison. This was not successful in all cases. Then, there is the danger of reptile and insect bites. Very fortunately, none of our employees have received a rattlesnake bite, to date. The wearing of good boots, and keen observation, are about the only safeguards that can be applied against this hazard. All of our first aid kits are supplied with snake bite outfits.

Cutting and felling timber is another hazard which must be given careful attention in connection with clearing right-of-way. The foreman or man in charge of this work must have a good knowledge of the methods employed to throw large timber. Men cutting small timber with axes should be spaced so that there will be no danger of injury from falling trees or from a fellow workman's axe. It is here, as elsewhere, that the foreman can play a most important part in accident prevention work. In certain localities where timber is not deep rooted, perhaps a safer method of felling large timber would be by blasting. The danger of being trapped by falling timber would be eliminated, as the men would be able to get out of danger before the charge went off. Furthermore, it is much easier to cut a large tree lying in a horizontal position than in a vertical one.

NUMEROUS BLASTING HAZARDS

In blasting stumps on the right-of-way, there are several hazards, one of which is the danger of injury from falling stumps and rocks. Another hazard is premature firing; this, however, is very remote. Possibly the greatest danger

(Continued on Page 80)

EXHIBIT I. DALLAS DOMESTIC RATE SALES

June to June Year—Split into (1) Period of no heat requirement (2) Period of space heat demand registration. All figures in cubic feet and are avearge sale per active meter.

	Cu. Ft. June 1923– May 1924	Cu. Ft. 1924– 1925	Cu. Ft. 1925– 1926	Cu. Ft. 1926– 1927	Cu. Ft. 1927– 1928	Cu. Ft. 1928– 1929	Six Year Average
(1) June-October.....	15,570	14,610	14,190	14,280	14,700	14,910	14,710
(2) November-May....	70,100	59,980	68,410	61,480	62,560	68,970	65,250
Year	85,670	74,590	82,600	75,760	77,260	83,880	79,960
ANALYSIS OF HEATING SEASON SALES (November-May)							
TOTAL.....	70,100	59,980	68,410	61,480	62,560	68,970	65,250
Less Average Sale Per Meter to Commercial Paying Domestic Rate	4,740	4,060	4,620	4,000	4,230	4,640	4,380
Less Allowance of 110 Cu. Ft. Per Day For Cooking and Hot Water	23,320	23,320	23,320	23,320	23,320	23,320	23,320
Remainder is Chargeable to Space Heating Demand	42,040	32,600	41,010	34,160	35,010	41,010	37,550
Degree Day Deficiency	2,613	2,004	2,558	2,106	2,192	2,573	2,341
Cubic Feet of 1000 B. T. U. Gas Required Per Degree Day Per Meter (In addition to Requirements for Cooking and Hot Water)	16.20	16.30	16.00	16.20	16.00	15.95	16.04

EXHI IT II.

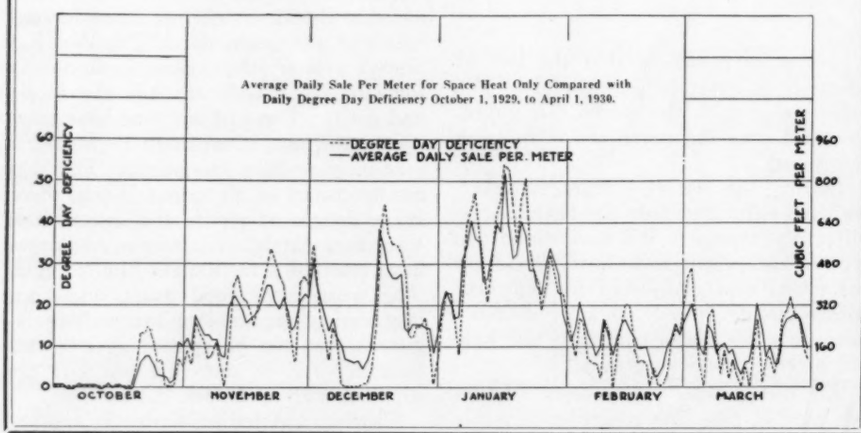


EXHIBIT III. DALLAS DOMESTIC RATE SALE DATA

Year	Population Served	Annual Domestic Rate Sales M. Cu. Ft.	Sales Per Capita Cu. Ft.	D. G. Co. Average Sale Price Per M. Cu. Ft.	Gold Dollar Purchase Value Rate in Cents Per M.
1920	(a) 204,000	2,576,280	12,600	49.4c	(b)29.
1921	206,000	2,650,481	12,800	68.6	43.
1922	222,000	3,102,733	13,900	68.6	46.
1923	239,000	3,429,026	14,300	68.6	49.
1924	256,000	3,736,633	14,600	68.6	52.
1925	272,000	3,967,815	14,600	70.8	57
1926	288,000	4,441,353	15,300	73.2	61.
1927	299,000	4,158,754	13,900	76.8	68.
1928	310,000	4,863,861	15,600	75.8	70.

NOTE—(a) Population figures, census and Worley's Directory.
(b) Based on Prof. Kemmerer's curve for value of gold dollar taking 1913 as par.

Application of Degree Day Computing Heating

By R. M. REDDING

FIVE or six years ago The Dallas Gas Company began to make occasional studies of the relation between temperature and natural gas requirements for domestic sales. Since that date from time to time operations have been such that accurate data covering maximum domestic rate demand have been available. These occasional opportunities in connection with analyses of yearly operations have afforded sufficient information to enable the company to set up certain measures of maximum demand, total yearly requirement, and space heating use, which values have proven reasonably accurate, and have permitted forecasts as to total sales, and predictions of maximum demand under given conditions, that have checked closely with performance.

In the hope that some of these studies may be of interest, tabulations and curves more or less related are submitted. As is usually the case when dealing with statistical data most of the story will be found in these compilations of actual operations.

As a background for the deductions to be presently drawn it may be in order to place before you briefly a statement as to the completeness of the development of domestic rate sales. For 20 years Dallas, both metropolitan and suburban, has used natural gas. At the present time this fuel for domestic purposes is looked upon as a necessity equal to water. A survey made last July shows that 99 per cent of the total domestic fuel requirements for cooking, hot water and heat for the 315,000 population in the area served is supplied by natural gas. Compared with the survey of the Real Estate Board, which is made each year, the number of active meters is 101 per cent of the indicated requirement to serve all domiciles, warehouses, stores, etc., in the city; hence, we may feel justified in the conclusion that sales volumes and other operative data taken in a city 99 per cent saturated as to domestic demand are a reasonably accurate measure of present day sales possibility.

To those charged with the advance estimating of sales in both old and new territory perhaps the most perplexing phase of the problem is that of determining how much gas will be used for space heating. We may think this is a problem of recent development; however such is not the case. It may be that the much used term Degree Day Deficiency is of recent coinage, but the attempt to develop a definite measure of the relation between temperature and fuel requirement dates back many years. An old edition of the "Ideal Fitter," now out of print, carries two curves showing the amount of coal that will be required in

R. M. Redding

Deficiency *to* Domestic *and* Loads

General Superintendent
*Dallas Gas Company**

Chicago and in Detroit per square foot of radiation per heating season. These curves show that if the number of hours during which heat is required be multiplied by the maximum demand and this product by .33, the result will be the season's fuel requirement. This, it will be noted, is only a variation of the Degree Day method of compilation.

Coming back to the question of development of a measure of gas fuel requirement for domestic use, other than cooking and hot water, there is submitted herewith as Exhibit I, an analysis of domestic rate sales in Dallas for the past six years. It will be noted that an operative year, from June 1 to June 1, is used. This is for the purpose of getting as nearly accurate periodic sales figures as the operation of the company will permit. This operative year is divided into two periods of five and seven months respectively. The seven month period, November to May inclusive, is that part of the year in which gas used for space heating purposes may appear in the billing.

The second section of this Exhibit I is an analysis of the sales per meter during this seven month period in which heat registration may appear. In the break down of this volume of sale it will be evident that we are starting with a definite known average sale per meter. However, the deduction for commerecial paying domestic date, and the deduction for cooking and hot water use, are estimates and must of necessity be so, due to the fact that the registration for all domestic rate service in the home is through one meter. With respect to the first deduction, namely commercial paying domestic rate, an analysis of one year was made and resulted in a value equal to 6½ per cent of the total domestic rate sale. A further survey of the six years under consideration develops that if 50,000 cubic feet per month be taken as a dividing line between pure domestic rate service and commercial and industrial paying domestic rate, the minimum percentage was 6 per cent and the maximum 7 per cent. Therefore, for the purpose of this analysis 6¾ per cent of the gross domestic rate sale is deducted for commercial and industrial use paying domestic rate.

The second deduction is that for cook-

*Presented at the American Gas Association Natural Gas Department Convention, held at New Orleans, La., May 5-8.

EXHIBIT IV.

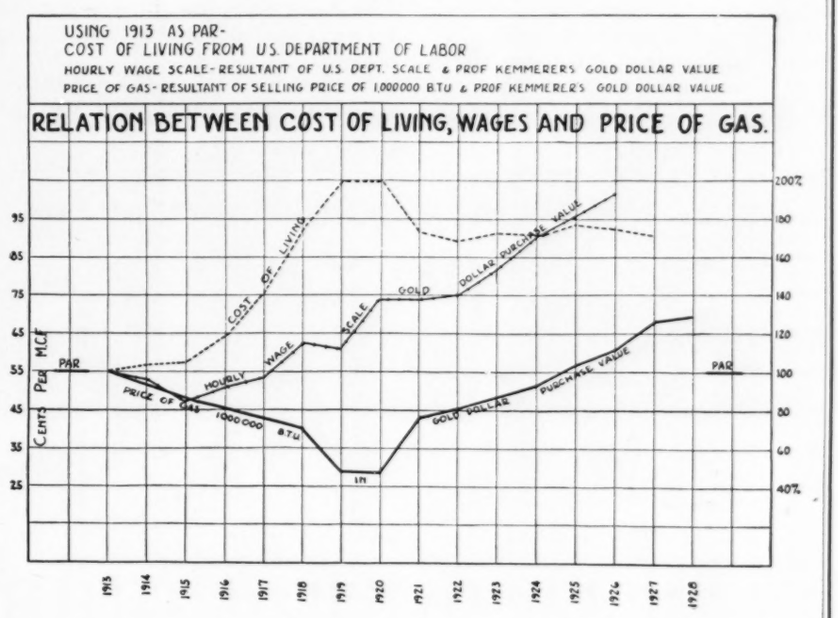


EXHIBIT V.

	Year Ending June 1, 1925	June 1, 1926	June 1, 1927	June 1, 1928	June 1, 1929
Total Domestic Rate Sale—M.C.F.	3,648,025	4,445,685	4,177,660	4,532,827	5,240,633
Deduction 6¾% for Commercial Use	246,242	300,084	281,992	305,966	353,742
Pure Domestic Sale	3,401,783	4,145,601	3,895,668	4,226,861	4,886,891
Population	256,000	272,000	288,000	299,000	315,000
Domestic Use per Capita	13,250 C.F.	15,200	13,500	14,100	15,450
Cooking and Hot Water Use *Per Capita	6,780 C.F.	6,780	6,780	6,780	6,780
Space Heat Use per Capita	6,470	8,420	6,720	7,320	8,670
Degree Day Deficiency	2,004	2,558	2,106	2,192	2,573
Heat Requirement per D.D.D. Per Capita	3.22	3.25	3.19	3.34	3.35 Avg. 3.3

County Gas Company, with approximately 30,000 meters in residential territory and with practically no commercial sales taking domestic rate, has a five year average domestic use for May to October period, of 12,425 cu. ft. per meter. For the other seven month period a value of 23,320 cu. ft. has been used, making an annual use of 35,745 cu. ft. The population ratio to live meters for the past five years is 5.2. This gives a per capita requirement of 6,780 cu. ft. for domestic cooking and hot water.

EXHIBIT VI. MAXIMUM DOMESTIC DEMAND

	24 Hours Ending 9 A. M. 12-8-27	24 Hours Ending 12 Noon 2-10-29	24 Hours Ending 12 Noon 1-17-30	24 Hours Ending 12 Noon 1-18-30
Domestic Rate Sale M. C. F.	40,007	50,963	59,576	64,976
6¾% Deduction for Commercial	2,700	3,440	4,021	4,386
Pure Domestic Use	37,307	47,523	55,555	60,590
Population Served	*260,000	310,000	315,000	315,000
Domestic Sale per Capita, C. F.	144	153	176	192
Cooking and Hot Water	21	21	21	21
Space Heat Use per Capita	123	132	155	171
Average Temperature	24.2	20.5	13.2	9.6
Degree Day Deficiency	40.8	44.5	57.8	55.4
Cu. Ft. per Capita per D. D. D.	3.02	2.97	3.00	3.08

*Metropolitan Dallas Only.

ing and hot water. This allowance is supported by operating figures for May and October, which months are average for the year, but somewhat lower in hot water requirements than the winter months, and taking into consideration the fact that 65 per cent of meters carry a hot water installation freely used during winter period. Subtraction of these two items from the total registration leaves a quantity chargeable to space heating.

If there be a definite relation between space heating demand and temperature the equation should show a constant per unit of heat demand from year to year. Division of the annual Degree Day Deficiency into the quantities of gas chargeable to space heating gives a surprisingly uniform value for this constant. As will be noted in the tabulation, this value is 16 cubic feet with a plus and minus tolerance of less than 2 per cent.

In so far as Dallas and north Texas are concerned this unit value has been verified on mass operation up to 300,000 meters.

In the tabulation which I have been discussing the time unit has been the overall heating season, or approximately six months. We believe that dealing in time units smaller than the heating season is inadvisable. The question naturally arises as to how sensitive is the relation that exists between temperature and fuel requirement for heating. To answer this a graph has been made up covering the daily mean temperature and the actual daily delivered sales for space heating, for the period from October 1, 1929 to April 1, 1930, and on a city-wide basis.

The degree days are from the local Weather Bureau. Daily volumes of gas used for space heating were determined by deducting from city gate delivery (1) Unaccounted-for, (2) Industrial sales, (3) Commercial paying domestic rate and (4) Allotment to cooking and hot water—the daily residual being space heating sales. This daily remainder divided by the number of active domestic meters on that day gives the actual delivery per meter for space heating (in addition to that used for cooking and hot water).

If the ratio of 16 cubic feet per meter per Degree Day Deficiency be correct then a plotting of the actual sale per meter against the D. D. curve and on a ratio of 16 to 1 should superimpose the sales curve upon the temperature curve.

Reference to Exhibit II, will show that this definite relation exists and that such relation follows with reasonable sensitivity when one considers that no weight is given to several possible minor variables that may affect volume of use in some degree.

A planimeter reading of those two curves gives a volume ratio of 146 to 147 for the elapsed time—October 1, to April 1.

Exhibit III is offered as record of the gradual stablizing of sales on a per capita basis. Generally, sales actual and potential are based on a "per meter basis." Obviously this is not a measure of saturation. The limit of sales must be considered as that volume which registers 100 per cent of the domestic rate fuel requirement of the total population in

(Continued on Page 48)

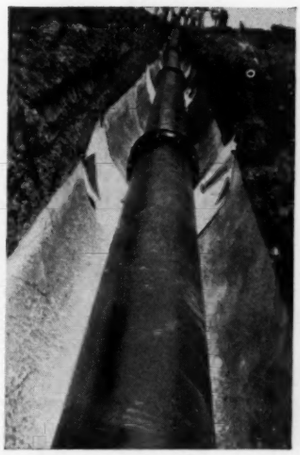
EXHIBIT VI-A. TYPICAL MAXIMUM DAY-DOMESTIC RATE SALE ONLY 24 HOURS ENDING 12 NOON FEBRUARY 10, 1929.

Hour Ending	Temperature °F.	Sales M. Cu. Ft.	Sales Per Meter Cu. Ft.	Sales Per Capita Cu. Ft.
1.00 P. M.	21	3,353	53.5	10.8
2.00 P. M.	22	3,218	51.3	10.4
3.00 P. M.	23	3,031	48.2	9.8
4.00 P. M.	24	2,724	43.5	8.8
5.00 P. M.	24	2,854	45.6	9.2
6.00 P. M.	24	2,844	45.4	9.2
TOTAL Avg.	23.0	18,024	287.5	58.2
7.00 P. M.	23	2,825	45.0	9.1
8.00 P. M.	22	2,750	43.8	8.9
9.00 P. M.	22	2,590	41.3	8.4
10.00 P. M.	22	1,999	31.8	6.4
11.00 P. M.	21	1,339	21.4	4.3
12 Midnight	20	970	15.5	3.1
TOTAL Avg.	21.6	12,473	198.8	40.2
1.00 A. M.	20	703	11.2	2.3
2.00 A. M.	19	543	8.6	1.7
3.00 A. M.	18	526	8.4	1.7
4.00 A. M.	18	507	8.1	1.6
5.00 A. M.	18	622	9.9	2.0
6.00 A. M.	17	995	15.8	3.2
TOTAL Avg.	18.3	3,896	62.0	12.5
7.00 A. M.	16	1,209	19.3	3.9
8.00 A. M.	16	2,127	34.0	6.9
9.00 A. M.	17	3,188	50.8	10.3
10.00 A. M.	18	3,431	54.7	11.1
11.00 A. M.	22	3,304	52.6	10.7
12 Noon	25	3,311	52.6	10.7
TOTAL Avg.	19.0	16,570	264.0	53.6
TOTAL—24 Hours	20.5	50,963	812.3	164.5
Population territory served		310,000		
Live Meters		64,070		
Live Meter Ratio		4.8		

EXHIBIT VI-B. TYPICAL MAXIMUM DAY-DOMESTIC RATE SALE ONLY 24 HOURS ENDING 12 MIDNIGHT JANUARY 17, 1930.

Hour Ending	Temperature °F.	Sales M. Cu. Ft.	Sales Per Meter Cu. Ft.	Sales Per Capita Cu. Ft.
1.00 A. M.	23	595	9.1	1.9
2.00 A. M.	23	547	8.3	1.7
3.00 A. M.	23	509	7.8	1.6
4.00 A. M.	23	477	7.3	1.5
5.00 A. M.	23	653	9.9	2.1
6.00 A. M.	23	1,175	17.9	3.7
TOTAL Avg.	23	3,956	60.3	12.5
7.00 A. M.	23	2,090	31.8	6.7
8.00 A. M.	21	3,199	48.7	10.2
9.00 A. M.	21	3,385	51.6	10.7
10.00 A. M.	19	3,198	48.7	11.5
11.00 A. M.	17	3,138	47.8	10.0
12 Noon	15	3,124	47.6	9.9
TOTAL Avg.	19.3	18,134	276.2	59.0
1.00 P. M.	12	3,206	48.8	10.2
2.00 P. M.	11	3,150	48.0	10.0
3.00 P. M.	9	3,107	47.3	9.9
4.00 P. M.	7	3,276	49.9	10.4
5.00 P. M.	7	3,491	53.2	11.1
6.00 P. M.	7	3,716	56.6	11.8
TOTAL Avg.	8.8	19,946	303.8	63.4
7.00 P. M.	5	4,133	63.0	13.1
8.00 P. M.	3	3,855	58.7	12.2
9.00 P. M.	2	3,446	52.5	10.9
10.00 P. M.	1	2,663	40.6	8.5
11.00 P. M.	0	2,047	31.2	6.5
12 Midnight	—1	1,396	21.3	4.4
TOTAL Avg.	1.7	17,540	267.3	55.6
TOTAL—24 Hours Avg.	13.2	59,576	907.6	190.5
Population territory served		315,000		
Live Meters		65,610		
Live Meter Ratio		4.8		

Lowering pipe into galvanized iron sheeting.



Ready for closing the sheeting over pipe.

The sheeting is drawn together by means of wire.

Pouring asphalt into mould formed by sheeting.

Defying Swamp Action *on* Pipe

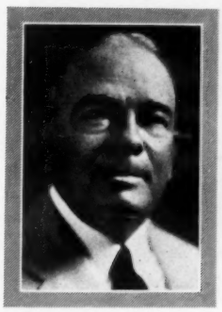
By FRANK W. KIRK

General Manager
Houston Pipe Line Company

A NEW method of protection against soil corrosion and electrolysis in the swamps of the Texas coastal plain has been developed by the Houston Pipe Line Company. It calls for an asphalt covering for the pipe, which provides an almost complete insulation from soils and fluids. After tests covering a two-year period, sections of this pipe have been examined and found to be in perfect condition.

In the experience of this company, a sufficient amount of this work has been done to prove the economy of the new method, in spite of the relatively high costs involved. For many years pipelining in the swampy districts has involved excessive costs in replacements. Corrosion in the salt and sulphur districts, especially in the overflow lands, has eaten out sections of pipe within two or three years, calling for a tremendous outlay in labor and replacements. In many of these districts, heavily impregnated with sulphur, a light solution of sulphuric acid is constantly formed to eat into the steel lines.

The new process calls for a 2-inch coating of asphalt for the pipe, applied within some form of container so that it may be poured and set to cover the entire circumference of the pipe. The first of these jobs by the Houston Pipe Iine Company was a stretch of several thousand feet of 12¾-inch pipe in Brazoria county, between Bay City and Freeport, and on the properties of the Freeport Sulphur Company. Box troughs of yellow pine were built and lowered into the trench. Wooden cleats were inserted to keep the pipe off the bottom of the trough. The line then was lowered into the trough and the asphalt poured, providing a minimum coating of 2 inches. The coating was allowed to set, and the trench then refilled.



F. W. Kirk

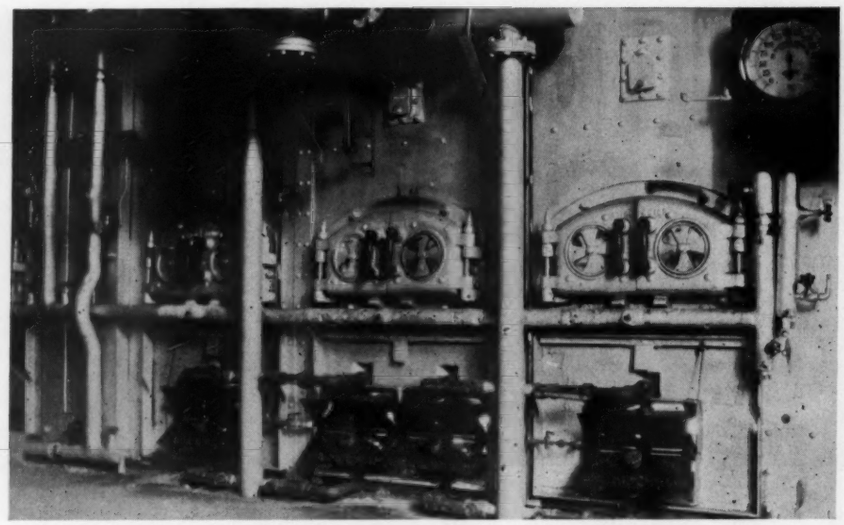
The company's second job was at the Gulf Hill plant of the Texas Gulf Sulphur Company in Matagorda county, which is subject to tidal overflows. Four thousand feet of 12¾-inch natural gas line that serves the Texas Gulf mines were coated in a similar manner in the summer of 1929.

After completing these two jobs Mr. Kirk started experimenting with galvanized iron sheeting, made especially for this work with Armco steel by the Western Metal Manufacturing Company of Houston. Sections were laid in several localities with such success that it was substituted for the wooden box construction. Although the material is more expensive, it provides a considerable saving in asphalt, because the sheeting is curved to circular form to fit the contour of the pipe, eliminating the needless space of the square corners necessitated in the box trough construction.

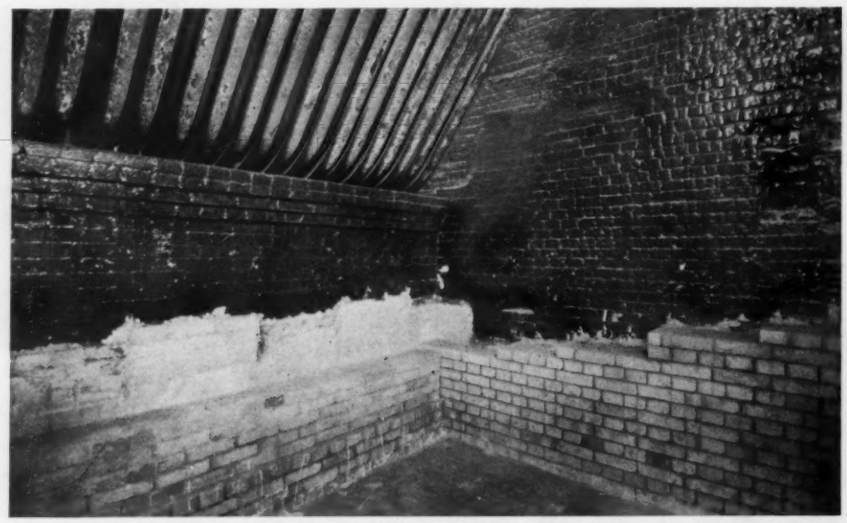
A third asphalt coating job is scheduled for the near future. It will take in several miles of 16-inch line in Brazoria County, between the Brazos river and Oyster Bayou, connecting the Bryans Mound and Hoskins Mound plants of the Freeport Sulphur Company. The galvanized sheeting will also be used on that project.

The procedure in bending the galvanized iron around the pipe is to lay the sheets of it over the ditch into which the pipe is to be buried, and then to lower the pipe slowly onto the sheets and into the ditch. In that way the sheet iron is forced to curl up around the pipe and to conform more or less to shape of the pipe. In the meantime the pipe is kept separated from the galvanized iron by means of pieces of wood, 2½ inches wide and 2 inches thick, sawed to fit snugly against the bottom and lower sides of the pipe. Besides keeping the pipe and the sheet iron separated by 2 inches, and thus allowing for the 2-inch thickness of asphalt that was to be applied, the wooden pieces also serve to keep the followers of the couplings between the joints of pipe from shearing the galvanized iron through the weight of the pipe. One of the pieces of wood is placed next to each coupling. After the sheets of iron are

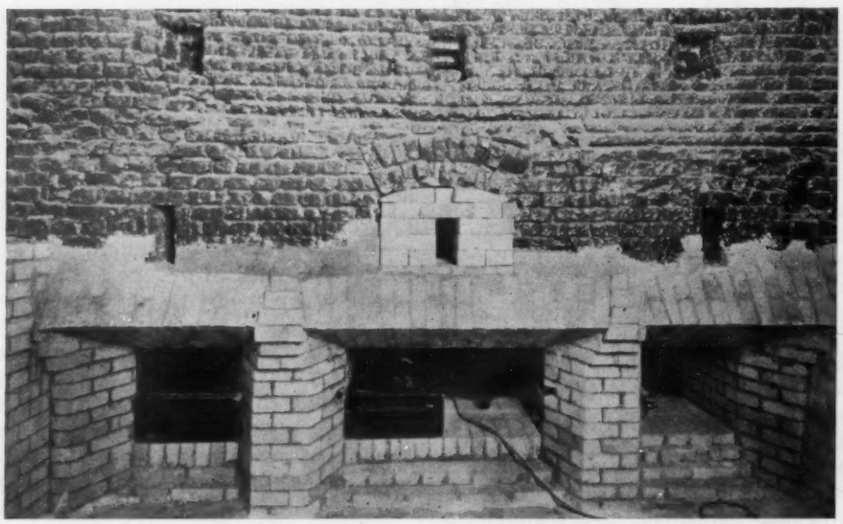
(Continued on Page 58)



Boiler No. 1, which was used in tests run by the Pacific Gas and Electric Company on comparative efficiencies of oil and natural gas. Eight Natural Gas Equipment Inc., Type A burners are installed through what were formerly the ashpit doors of 600-h.p. Stirling water tube boilers.



View of bridge wall in boiler No. 1, showing 9-inch fire brick veener wall built to protect red brick exposed where the oil checker deck was removed. Note the severe slagging of the side wall by the oil flame.



View showing inside face of front wall of boiler No. 1, with burner openings and three gas burners set in place. Note how the brick in the upper portion of the photo have been slagged by the oil fires.

GAS *versus* OIL

THERE are few who will question the superiority of gas as an industrial fuel from the standpoint of cleanliness and convenience, but the decision of the manager of a plant as to whether or not he can economically use gas in place of other fuels depends almost entirely upon the possibility of getting back the investment in gas utilization equipment by savings made over a reasonable period of time. It is the job of the industrial gas salesman to analyze conditions in each plant thoroughly and to build up as much evidence on the savings side of the balance as possible. In cases where other fuels are cheaper than gas on a heat basis, the salesman can often make his job easier by the wise choice of equipment, but he should always keep in mind the fact that while a sacrifice of efficiency on the altar of price may make it easier to get the load, it will surely increase the difficulty of holding the load.

Those who have used natural gas as a fuel for generating steam, or have been in touch with plants that have, know that even with the cost of gas somewhat higher than oil on a heat basis, the total cost per 1000 pounds of dry steam delivered to the steam header is less with gas, providing we use proper burner equipment properly installed. The total cost of steam is made up of several items and includes fuel cost, overhead, depreciation of equipment, maintenance of equipment and labor for operating. It is easy enough to see that a saving in any one of these items tends to reduce the total cost of steam and that lower cost of B.t.u.'s is not at all necessary in order to show an overall saving. We will now outline briefly the effect gas will have on each of these items as shown by the experience of plants using gas.

Fuel Cost: Fuel cost should not be judged by the cost of heat purchased, but by the cost of heat transferred into steam available for useful work. Gas can usually be utilized more efficiently than any other fuel for the following reasons:

as a Fuel *for* Steam Boilers

By L. P. STOKER

Industrial Gas Engineer
Pacific Gas and Electric Company

1. There is no loss of fuel through poor atomization.

2. Better heat distribution can be obtained, resulting in higher heat transfer in the radiant section of the boiler with a corresponding decrease in the temperature of gases discharged to the stack.

3. Load conditions can be followed more readily by the fuel rate because of greater ease of control. This prevents waste of fuel by burning in excess of plant requirements or loss of production by inability of the boiler to pick up a suddenly increased load.

L. P. Stoker

4. With gas, there is no soot or smoke, resulting again in higher efficiency because after once being cleaned the heating surfaces stay clean.

5. With gas, all the steam generated is available for useful work since no pumping, heating, atomizing or soot blowing is required.

Overhead: In plants where oil equipment is already installed this item will remain practically unchanged. If gas burning equipment is put in first and no stand-by is used the investment will be much less, since no storage or handling equipment is necessary with gas.

TABLE NO. 1

	Typical Fuel Oil	Kettleman Hills Gas
Gravity	16.0° A.P.I.	0.67 (Air=1.0)
B.t.u. per lb.	18,700	23,500
Per cent carbon by wt.	84.5	76.7
Per cent hydrogen by wt.	12.0	23.3
Nitrogen	0.7	0.0
Sulphur	1.5	0.0
Oxygen	1.3	0.0
Lbs. water formed per lb. (Combustible)	1.063	2.083
Per cent loss in latent heat of water formed	5.52	8.60

TABLE NO. 2

	Boiler No. 1 Fired with Gas	Boiler No. 2 Fired with Oil
Duration of tests	272 hrs.	260 hrs.
Fuel consumption per hour	29,412 cu. ft.	1,741 lbs.
Steam pressure, lbs. per sq. in.	148 lbs.	148 lbs.
*Moisture in steam	2.0%	2.0%
Actual water evaporated per hour	26,106 lbs.	25,340 lbs.
Equivalent evaporation per hour from and at 212 deg. F.	25,783 lbs.	24,981 lbs.
Boiler horsepower	747	724
Per cent normal rating	125	121
Fuel consumption per boiler h.p.	39.3 cu. ft.	2.40 lbs.
Overall thermal efficiency	75.6%	73.7 %
Fuel required to evaporate 1000 lbs. water from and at 212 deg. F.	1,140 cu. ft.	69.7 lbs. or .213 bbls.

*Based on preliminary tests, steam quality assumed average of 98% for both boilers.

Depreciation of Equipment: This item is decidedly lower with gas. Even distribution of heat reduces strains in the boiler and the absence of elements in the gas that burn to acid radicals which, when absorbed in water, become corrosive, increases not only the life of boiler and stack, but also other metal structures in the vicinity of the boiler room.

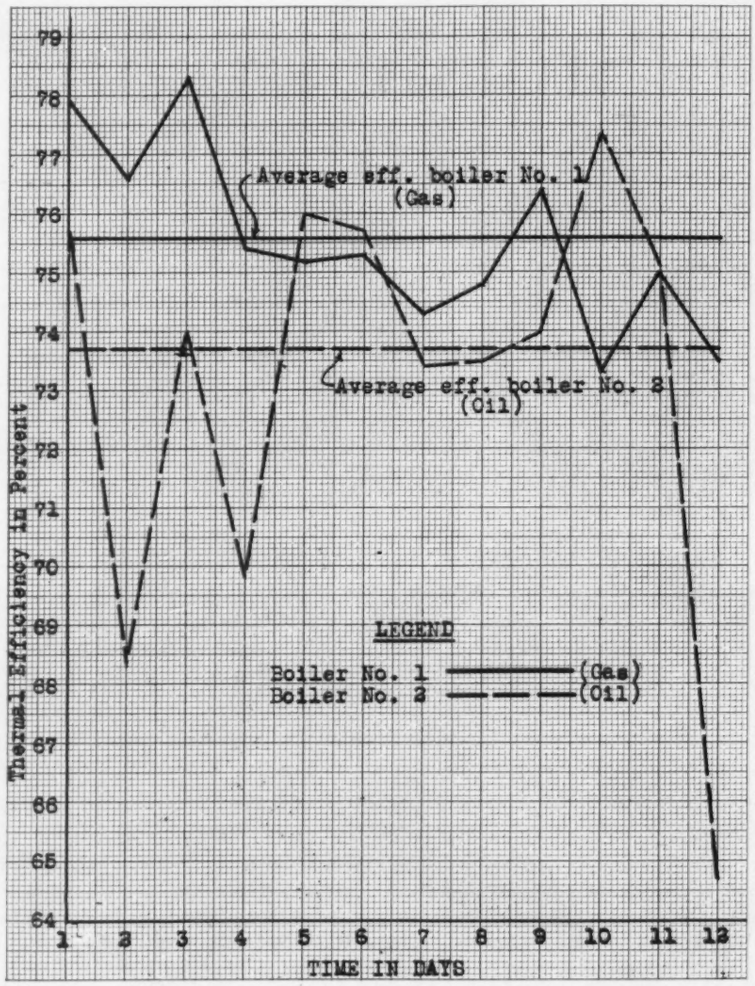
Maintenance: Decreased maintenance costs show up mostly in the brick settings. Even distribution of heat and the freedom from localized heating obtainable with gas can be expected to increase the life of furnace linings four to six times on jobs which are driven to high ratings. Gas also eliminates all mintenance of fuel pumps, blowers, etc., in the generally accepted types of boiler gas burners.

Labor: With automatic regulation, any desired steam pressure, up to the capacity of the furnace, can be maintained with little or no attention from the operator. The boiler room can be kept clean with very little effort and the labor of cleaning the fire side of the tubes becomes negligible.

However it is often times impossible to place any definite monetary value on savings effected in the last four items by the use of gas, since they vary so much from plant to plant. Therefore, in cases where the cost per B.t.u. is much higher with gas than with oil, it may be necessary to evalute them empirically by means of a trial installation in the plant in question. This necessitates good burner equipment, for in these cases, the bulk of the burden of selling is thrown onto the equipment itself. It must not only be able to develop high efficiency under expert handling, but must be able to maintain this efficiency over the entire load range of the plant and with only such attention as it may receive from an operator unfamiliar with its use, or perhaps one even mildly hostile to the attempted invasion of gas into his domain.

In estimating comparative costs of oil and gas it is customary to assume equal efficiencies for both. This assumption is often questioned by engineers who have never used gas under boilers, but have computed the theoretical losses for each fuel and found that the loss due to the unrecoverable latent heat of the water, formed by burning the hydrogen in the fuel, is higher with gas than with oil because of the higher hydrogen content of gas. The difference in this loss for a typical heavy fuel oil and the Kettleman Hills gas being served in Central California is shown in Table No. 1.

For higher gravity oil the difference would be somewhat less.



Graph of boiler efficiencies in comparative tests on gas and oil, conducted by the Pacific Gas and Electric Company

This does not mean, however, that just as high efficiencies cannot be obtained with gas as are obtained with oil. In order to secure definite data on this point the Pacific Gas and Electric Company conducted some comparative tests on boilers fired with these two fuels. In order that the tests would be indicative of what can be expected in day-after-day operation, two identical 600-H.P. Stirling boilers were fitted with the instruments necessary to record the quantity of water fed to each boiler, temperature of the feed water, steam pressure, and quantity of fuel used. The boilers supplied steam for the usual plant load, which called for steam at rates varying from 50 per cent to 150 per cent of rating, 24 hours per day, seven days a week. During the test no attention was given to the boilers other than is ordinarily given by the regular operator.

The gas fired boiler, designated as No. 1, was fitted with the eight Natural Gas Equipment company type "A" burners, installed in the existing ash pit doors. This, of course, necessitated removal of the false floor and checker work, and insulating the concrete slab which then became the floor of the combustion chamber. The flow of gas to the burners was controlled by a 4-inch Wilgus regulator valve.

Boiler No. 2 was operated with the regular oil burning equipment, consisting of three steam atomizing oil burners firing from the bridge wall. Both boilers were fitted with automatic fuel and damper control, but during the test this was disconnected on Boiler No. 1.

Orifice meters were used to measure the feed water to each boiler and the gas to boiler No. 1. Recording thermometers were installed in the water feed lines at a point near their entrance into the boilers and the average steam pressure was obtained from a recording pressure gauge. Fuel oil was metered by a Bassler oil meter that was calibrated previous to the test by weighing a definite volume of oil as measured by the meter. The correction for this instrument was zero.

The intention was to operate the boilers with the regular controls for the full period of the test, but due to the necessity of making some changes in the oil piping in order to include the meter in the regular feed line, boiler No. 2 was not put on the automatic control until the seventh day of the test. Prior to that time the boiler was operated on practically constant load and regulated by hand. Boiler No. 1 was operated in a similar manner until the fifth day of the test, when it was cut in on the Wilgus regulator.

Approximately 50 per cent of the feed water was make-up necessitating blowing down at least once every 24 hours. Since there was no means of measuring the amount of water and steam lost in the blowdown, the water and fuel metered during the blow-down period was subtracted in order to obtain the true evaportion of the boilers.

The oil was sampled daily and the gravity taken. The average heating value was taken as 18,900 B.t.u. per pound, the average of several checks made by the plant laboratory.

The heating value of the gas was taken from the continuous calorimeter in the meter house at the Potrero Gas Plant. This calorimeter is checked several times daily on Junkers calorimeter.

No adjustments were made on the dampers of boiler No. 1 after it was put on the Wilgus regulator, the inspirating principle of the burners being relied upon to maintain the proper ratio of gas and air.

The conditions surrounding the two boilers were as nearly the same as they could be made, with the exception that No. 1 was next to a north wall, the windows in which admitted all the ventilation to the boiler room. There was quite a strong draft of cold air blowing over the side and drums of this boiler, which probably increased its radiation loss considerably.

Daily averages are not given because of space limitations. It will be noted in the tabulation of overall averages (see Table No. 2) that the gas boiler operated a total of 272 hours, while the oil boiler operated only 262. This was due to the fact that a portion of the refractory lining of the front wall of the oil fired boiler fell in, preventing that boiler from completing the full 24-hour run of the 12th day.

The quality of the steam in both boilers was checked with a throttling calorimeter at various rates previous to the beginning of the test and was found

(Continued on Page 52)

Is *the* Special Sale Justified?

A General Manager and a Commercial Department Head Espouse Diametrically Opposite Views on This Controversial Matter

A GAS company executive sends *Western Gas* the two letters published below, in which are summarized the leading arguments on this subject of special sales—and whether the gas utility should engage in them. The topic is one which develops strong opinions, on one side or the other, and it calls for frank discussion. While the author of our current letter exchange prefers to remain anonymous, we shall welcome further views on the special sale controversy.—*Editor.*

My Dear Commercial Manager:

"IT is my opinion that our company's interests are injured in two particulars through the frequent sales which we conduct on gas appliances.

"First, I believe that we are sacrificing our legitimate profit in an effort to build up immediate sales. For example, let us analyze the sale of a - - - - Range as outlined in the advertising which you sent us December 31st. This range is to be sold for $109.00. It costs us $68.00, leaving a gross margin of profit of $41.00, out of which we must take the following estimated expenses:

Salesman's commission	$10.90
Advertising	2.50
Stores expense, etc.	10.00
Old stove allowance	5.00
Cash discount	5.45

—or a total expense of $33.85, which leaves a net margin of profit of $7.15. According to my way of thinking, this is not sufficient to take care of our business adequately.

"The second way in which I think our interests suffer is that the numerous sales which we are having are undermining the confidence of our customers in our regular prices. As an example, a few days ago, Mr. - - - - was endeavoring to sell Mr. Blank a - - - - burner. When the burner was priced to Mr. Blank, his first remark was, 'Why should I pay that price when I feel sure that it will not be long until you put on a sale giving a large discount on this burner? Some time ago I purchased a range from you, and only a week or so later I saw the same range advertised at a price 20 per cent less than I had paid for it.'

"It is my opinion that two range sales per year would be of advantage to us, but I do not believe that one sale following directly upon the heels of another, even though it does result in running up our present volume of sales, is advantageous to us in the long run. This, I think, is particularly applicable to replacement business. If we could say that in making the sale of a range we are increasing our load, the story would be different, but on sales practically all of the appliances sold are for replacement and probably result in a reduction rather than an increase in load.

"It is my opinion that this class of business should be done on a profitable basis and that the profit should not be sacrificed in an effort to run up volume of sales. It is my opinion that should we discontinue all sales, we probably would have a 12 months total sales as great as we would have at present and that the profit accruing from these sales would be much greater than it is at present. We would then be in a position to reduce the mark-up on our merchandise and to get it on the market in a more orderly manner.

"I would appreciate an expression of your ideas concerning this matter."

Yours very truly,

General Manager.

My Dear General Manager:

"I HAVE your good letter outlining your views on merchandising, and can say with all sincerity that, up to a certain point, I am greatly in harmony with them. The sales department cannot be in full sympathy with your general plan however, owing to the fact that the methods now being pursued have proved themselves to be successful; and we do not feel that a more passive plan, such as the one you suggest, will build the gas load or the merchandise net as successfully as the method we are now using.

"Your letter suggests that we are sacrificing legitimate profits in an effort to build up immediate sales; also that we are injuring ourselves through these special sales, in undermining the confidence of our customers in our regular prices. You also point out the fact that many of the sales are replacements, and instead of building load, reduce the load; and you express the opinion that if we were to discontinue all sales, we probably would have a 12 months' volume as great as that which we have at present, with a much greater profit than we have at present.

"As you know, we are aiming through merchandise sales for the one great objective, increased gas sales. All other things in the merchandise department are incidental to this. However, it is our policy to maintain prices on a basis comparable to those of other merchants. In doing this we naturally feel it proper that we should likewise show a reasonable net on our merchandise sales. The gas company is somewhat limited in its range of appliances and consequently in maintaining an active selling program it may appear that we are repeating too frequently with various appliances. On the other hand, it is planned to have a different back-ground or basis for each sale, the purpose being to offer the company's list of appliances to varying types of buyers. Furthermore, we have certain seasonal slacks, at which time we must consider means of obtaining increased merchandise gross and at the same time conserving net.

"To consider, for example, the small margin of profit which you pointed to in your letter, let us assume that we did not make that particular sale. Our expenses during the month go on just the same whether we do business or fail to do business. What we are after in any one month is to balance up our line and stimulate our sales to the extent of showing a profit rather than showing in the red. We do not recommend a very heavy expenditure on advertising during a January campaign, nor do we recommend a particularly strenuous campaign. The campaign however, does give the sales people an opportunity to appeal to certain of their customers on a basis which produces action. We

(Continued on Page 64)

Effect *on* Appliance Operation *and* Physical Variations

By F. E. VANDAVEER

ONE of the most important and difficult problems confronting the approval requirements committees of the American Gas Association when they began the preparation of appliance approval requirements, was the selection of the proper test gases. Gas appliances approved under these requirements were to be used in all sections of the United States and Canada and if satisfactory performance was to be obtained, it was felt that the tests applied should anticipate all of these various service conditions. It was obviously impossible to test each appliance under all conditions of service since the gases being supplied and the pressure at which they are distributed differ markedly in various sections of the country. A survey made of the gas supplies of cities and municipalities showed extreme variations in heating values from 400 to 1200 B.t.u. per cubic foot, specific gravities from 0.37 to 0.75, pressures from 1¾ inches to 16 inches and chemical composition from zero to 60 per cent hydrogen, hydrocarbons from 21.0 to 96 per cent, inert gases from 1 to 30 percent, and carbon monoxide from zero to 35 per cent.

Having this situation in mind, the committees requested the A.G.A. Testing Laboratory to conduct certain research to determine the possibilities of selecting a few representative test gases and test pressures to indicate what might be expected when an appliance is required to operate under any gas service condition ordinarily encountered.

For this study, a number of appliances, particularly gas ranges, with different designs of burners were selected for operation under varying conditions. To determine what gases should be used during the approval tests, duplicates of natural gases served in Ohio, Pennsylvania, West Virginia, and southern California were obtained. Manufactured gases similar to those distributed in Boston, New York, Philadelphia, Baltimore, Washington, Chicago, Denver, Tacoma, Portland, Oregon and San Francisco at that time were duplicated. This range is representative of the gases served in all our principal cities. The operation of appliances for combustion and burner operating characteristics was observed in all instances, and as a result, it was found that three gases would give an indication of what might be expected on all others.

The certification that an appliance will work satisfactorily in any section of the country involves primarily the determination of correctness of its design. If an appliance is correctly designed, it is capable of adjustment and satisfactory operation under the above mentioned conditions. Such assumptions are based, however, on the theory that the gas supply is constant within the limits of pressure specified, and that the composition and specific gravity of the gas do not vary more than the allowable limits as established by our mixed gas research investigation. If the gas supply varies more than these allowable limits, an approved appliance cannot be expected to operate entirely satisfactorily. In our approval tests, therefore, our assumption is that the gas supply will remain reasonably constant in pressure and composition; while in our mixed gas research work, the problem was to determine the maximum variation in gas supply to which an approved appliance may be subjected without changing either the gas or air adjustment, and yet perform satisfactorily. The test work on this latter investigation is nearing completion and data on it may be obtained from the American Gas Association headquarters by an accredited company member.

The selection of certain test gases involved the consideration of the effect on appliance operation of such variation in the gas supply as pressure, specific gravity, heating value and chemical composition. Since this phase of the work was completed, our mixed gas research has further confirmed it.

Effect of variation in gas pressure: A

Fig. 1. A section of the mixed gas research room in the American Gas Association Testing Laboratory, Cleveland, Ohio.

of Chemical *in the* Gas Supply

*Supervisor, American Gas Association Testing Laboratory**

rather careful survey of gas pressure conditions over the United States indicated that 3.5 inches of water column was about average for manufactured gas, and 7 inches water column for natural gas. These figures were chosen, therefore, as the normal pressures for these respective gases. Permissible pressure variations usually equal about 50 per cent either way from these average figures and in a general way, the approval tests were designed to fit these conditions. All adjustments of air and gas are made at normal pressure and remain unchanged with a change in pressure to 25 per cent and 50 per cent above normal and 50 per cent below normal. An increase in pressure without changing the adjustment increases the gas rate directly as the square root of the pressures. Thus, if the pressure is increased from 3.5 inches to 5.25 inches, the gas rate is increased 22.5 per cent according to the following formula:

$R_1 : R_{1.5} = \sqrt{P_1} : \sqrt{P_{1.5}}$

Where R_1 = Gas rate (cu. ft. per hr.) at P_1 pressure

Then $R_{1.5}$ = Gas rate (cu. ft. per hr.) at $P_{1.5}$ pressure

If R_1 = Rate at normal pressure = 9 cu. ft. per hr.

And P_1 = 3.5″ water

And $P_{1.5}$ = 5.25

$$\text{Then } R_{1.5} = 9\sqrt{\frac{5.25}{3.5}} = 9 \times 1.225 = 11.02 \text{ cu. ft. per hr.}$$

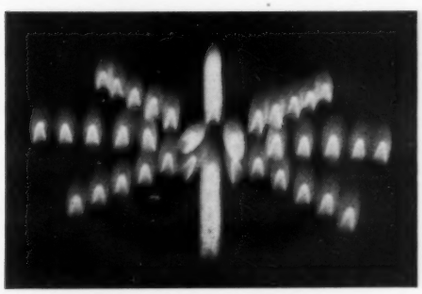
As shown by the above figures, a burner adjusted for 9 cubic feet per hour at 3.5 inches pressure would be required to handle 11.02 cubic feet per hour of gas at 5.25 inches pressure. With this increased gas rate, incomplete combustion might result from over-crowding of the burner, insufficient venting of the products, and inadequate supply of secondary air, or lack of primary air.

A decrease in the gas pressure decreases the gas rate directly as the square root of the pressures. Under this condition of test, incomplete combustion seldom occurs except where a shorter flame has more tendency to impinge on material placed above the burner. An example of this kind is the usual type of gas range oven burner. Under low pressure conditions, there is a tendency toward flash back and back pressure in the burner. Consequently, these tests require that an appliance be flexible in operation to the extent of a 50 per cent variation in gas pressure from the normal adjustment. In this manner, the allowable variation in gas supply is anticipated. The effect on the flame of a top burner of a 50 per cent increase and a 50 per cent decrease in pressure is shown in Fig. 2. The burner was adjusted on coke oven gas to a rating of 9,000 B.t.u. per hour at normal pressure. No change in the air or gas adjustment was made when the pressure was varied.

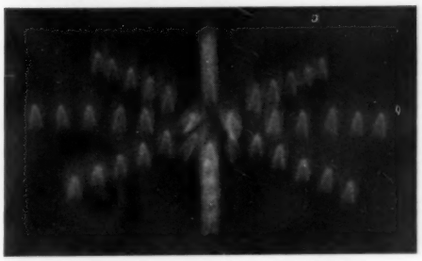
In addition to conducting tests at normal adjustment of 3.5 inches for manufactured gas and 7 inches for natural gas, tests for completeness of combustion are also made on gas ranges with the full rating on the burner at 2 inches pressure, using coke oven gas of 550 B.t.u., 0.40 specific gravity, and at 4 inches pressure using natural gas of 1125 B.t.u. and 0.65 specific gravity. At low pressures, the burner is subjected to severe tests for its ability to inject air and maintain a good uniform flame.

Effect of specific gravity on appliance operation: The specific gravity of a gas plays an important part in the satisfactory operation of an appliance. Assuming the same volume of two gases at equal pressures flowing through an orifice, the momentum of the gas stream is a function of the mass x velocity, or M—mv; consequently, the air injecting qualities would be proportional to the square roots of their specific gravities. For example, if equal volumes at equal pressures of gases having specific gravities of 0.65 and 0.35 are flowing through an orifice, the energy available for air injection is 36 per cent greater in favor of the 0.65 specific gravity gas, according to the formula

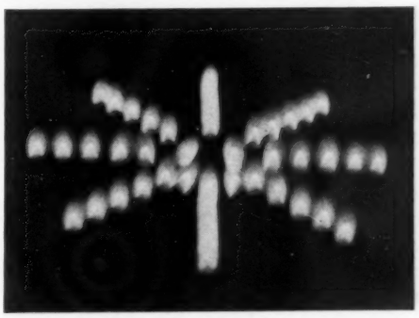
$$M = \sqrt{\frac{.65}{.35}} = 1.36$$



Top burner flames at normal pressure.



Same burner subjected to an increase of 50 per cent.



Same burner operating at a reduced pressure of 50 per cent.

Fig. 2. Showing effect of an increase and a decrease of pressure on flames of a top burner, other conditions remaining the same.

where M represents the energy available.

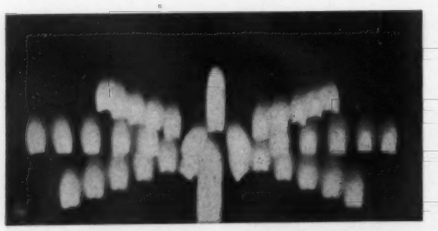
The volume of a gas which will flow through a given size orifice, assuming other conditions the same, is inversely proportional to the square root of the gravities. For example, if an orifice is passing 10 cubic feet of 0.4 specific gravity gas under the same conditions, it will pass

$$10 \times \sqrt{\frac{0.4}{0.6}}$$

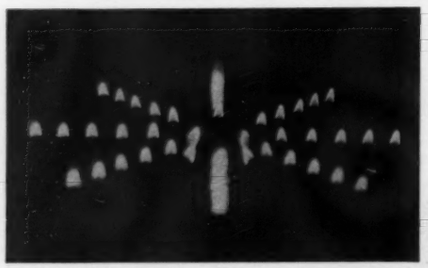
or 8.15 cubic feet of 0.6 specific gravity gas.

From the above theoretical considerations, it may be concluded that a gas having a low specific gravity presents a very difficult test on a gas burner, due to the fact that the kinetic energy available in the gas stream for injection of primary air is low. A low specific gravity gas with a comparatively high heating

*Presented before the American Gas Association Joint Production and Chemical Conference, held at Hotel Cleveland, Cleveland, Ohio, May 21, 22, 23, 1930.



Burner adjusted normally on gas of 0.64 specific gravity.



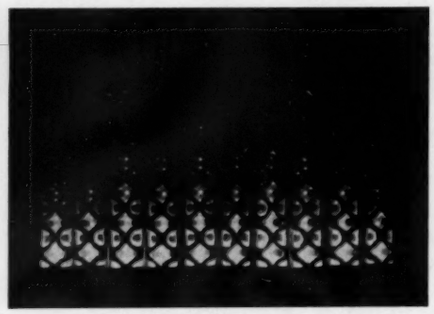
Same burner with same adjustment operating on 0.75 specific gravity gas.

Fig. 3. Illustrating the effect of an increase in specific gravity on the operation of a range top burner.

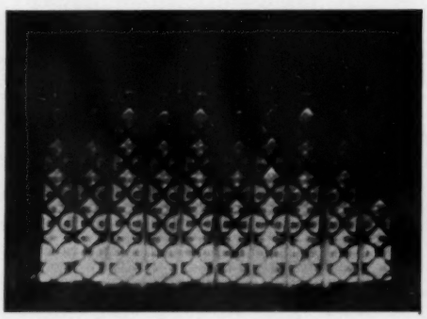
value would present a very severe test on a gas burner from the standpoint of combustion, since the flame would be long and soft, and when this type of gas is supplied at low pressure, a further difficulty is imposed. One of the test conditions applied to gas ranges embodies all of these factors, the test gas being a coke oven gas of 550 B.t.u. and 0.40 specific gravity and the test pressure 2 inches water column with the burners adjusted to their normal burning capacity. An illustration of the effect of an increase in specific gravity on the flame of a top burner is given in Fig. 3. The heating value and pressure remained constant.

Effect of increasing or decreasing the heating value: The effect of heating value changes are in general the reverse of those occurring with specific gravity variations. A decrease of heating value is similar to an increase of specific gravity in that the rate of heat input is retarded, the flame through lessening of the total air requirement is hardened, and both effects tend to promote flash back and noisy burner operation. When the heating value becomes greater, the rate of heat input is increased and the flame is longer because of the increased air requirement, while the primary aeration remains fixed. Here, the hazard is mainly one of incomplete combustion, due to the over-crowding of the combustion chamber and flue passages. A variation either way, if excessive, may lead to a loss of efficiency in heat transfer. Fig. 4 shows the effect on a radiant heater of an increase in heating value. The flames streaming out the top of the radiants on the higher heating value gas will be noted.

Considerable difference in the operation of a burner on a low heating value gas compared to its operation on a high heating value gas may be observed. A low heating value water gas usually has a fairly high specific gravity, and both properties tend toward obtaining a short, hard flame, and possibly noisy burner operation and flash back. Generally speaking, very little difficulty from incomplete combustion is ever experienced. The difficulty comes in being able to obtain proper primary air adjustment and sufficient capacity through various accessories.



Heater burning at normal adjustment on gas of 959 B.t.u. per cubic foot.



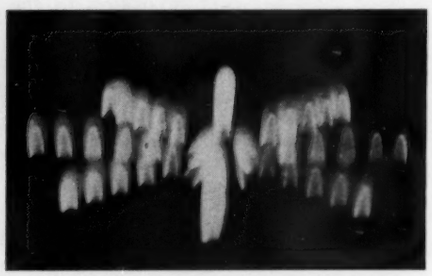
Same heater with adjustment unchanged operating on gas of slightly higher heating value.

Fig. 4. Showing effect on flames of a radiant heater of an increase in the heating value, specific gravity and pressure remaining constant.

A high heating value gas, such as the hydrocarbon gases typified by natural gases, has just the opposite effect on an appliance. These gases have a specific gravity of very close to the low heating value water gas. Since the heating value is high, the air required for combustion per cubic foot of gas is high, and the energy available for air injection is low. For example, 404 B.t.u., 0.68 specific gravity carburetted water gas required 3.49 cubic feet of air per cubic foot of gas for complete combustion, while 1126 B.t.u., 0.63 specific gravity natural gas requires 11.2 cubic feet of air per cubic feet of gas, or more than three times as much. Assuming that it is necessary to inject 60 per cent of the total air for combustion as primary air, a cubic foot of natural gas would have to do approximately 3.2 times as much work as a cubic foot of 400 B.t.u. water gas. To compensate to some extent for this condition, natural gas is usually maintained at nearly double the pressure of manufactured gas. However, the difficulty usually encountered due to poor air injection and resulting long and soft flames is incomplete combustion. Flash back and noisy burner operation seldom occur.

Effect of changes in chemical composition: The chemical composition of a gas fixes the heating value and specific gravity and possibly is the basic factor in considering the effect of various gases on appliance operation. The effects of specific gravity and heating value have been previously considered, but in addition, there is a distinct effect on appliance operation of the rate of flame propagation, inert content, and percentage of various constituents in the mixture. This may be observed by watching 400 B.t.u. carburetted water gas and natural gas burning in good burners of the same design. Water gas will burn with a distinct inner cone, and with a hard, short flame, growing sharper as the air is increased, and will ultimately flash back or possibly blow from the ports. Natural gas, under the same conditions, usually burns with a long, comparatively

(Continued on Page 56)



Flame obtained on adjustment gas.

Flame obtained on the same burner with no change in adjustment supplied with a gas of different chemical composition.

Fig. 5. Showing effect of a change in chemical composition on the appearance of the flame of a top burner. Heating value, specific gravity and pressure remain the same in both cases.

PACIFIC COAST GAS ASSOCIATION

447 Sutter Street, San Francisco, California
A Department Conducted by Clifford Johnstone, Managing Director

Convention Contests

THE three contests for gas company employees being sponsored by the Public Relations Section, are attracting unusual attention this year. The Essay Contest for which 53 prizes totalling $400 are offered, is being participated in by the employees of 12 companies. The subject of the essay is "Modernize with Gas" and the rules governing submission of essays appeared in April *Western Gas*. F. H. Holden of Southern California Gas Company is director of the contest for the Association, and each participating company has a local director of its own.

Nine companies are planning elimination contests preliminary to entering contestants in the Three Minute Speaking Contests for men and women, to be staged as a part of the Convention program. The subject for men is "Gas in Industry," and for women "Gas in the Home." Don C. Ray of San Francisco is conducting the men's contest and Miss Mildred Hinrichs of Salinas, the women's contest. Individual company directors have also been appointed.

Public Relations Stunts Night has been a big feature of our last three conventions. This year it is being directed by D. L. Scott of Los Angeles, who reports greater interest than ever before. Six companies have already signified their intention of trying to wrest the Addison B. Day Trophy from the Los Angeles Gas and Electric Corporation, whose employees have won it each year since it was put in competition.

Committee Reports Due

THE annual ultimatum has gone forth that all committee reports are due and collectible on and after June 1. Committee chairmen have been supplied with complete information as to the preparation and disposal of reports, and great has been the resulting activity. While it is too early to predict the thoroughness and general calibre of this year's committee work, there has been a very steady and earnest activity throughout the year, which should result in reports of unusually high value. The Association will continue its practice of printing reports, where their contents warrant it, in advance of the Convention as a part of the September issue of *Western Gas*, so that the Convention sessions may be left free for discussion.

Olympic Hotel, Seattle, Wash.—where P. C. G. A. Regional Conference will meet, June 26-27.

Northwest Conference Program Ready

THOSE who are fortunate enough to be present when the roll is called at Seattle on June 26 will be in a position to take back to their jobs many of the latest wrinkles in gas company technique, no matter what their jobs may be. The occasion is the Annual Northwest Conference of the Pacific Coast Gas Association and the time is all day Thursday and Friday, June 26 and 27. Those who are interested in sales and advertising will do well to stay an extra day as well, and attend an open meeting of the Cooperative Advertising Committee which will start early on Saturday morning and last until the last word is said, whenever that may be.

The program will be well rounded, timely, and instructive. President F. H. Bivens will preside at all general meetings, and all Section Chairmen are planning to be present. The conduct of the meetings will be informal and an opportunity will be given for all present to question the speakers and to give their own views on the subjects discussed.

Now for some idea as to what these subjects are to be. We were all very much gratified when the gas business in Salem, Oregon, was taken over by the Portland Gas and Coke Company. It had been managed previously by a company whose heart and pocketbook were dedicated to the electric business. The plant was in the last stages of dissolution; the town was inadequately piped, and the prestige of the ideal fuel was dragging in the Salem mud. We have it on reliable authority that one woman, who had been to Portland and knew what gas service could be, tried to have a gas stove installed in her Salem home. She would be battling the electric range salesman yet if she had not had a gas stove smuggled into town in the dead of night and connected by a gas man from other parts. Then came that Portland crowd, and how the plant was kept running, how the pipe line was built, how mains were laid, and how the load was built up, will be graphically told by Grant Reddick of Portland, one of those who did these things.

A slightly different situation will be described by C. E. Rutledge, district manager in Orange County for the

Southern Counties Gas Company. When Ole Hansen left Seattle he went to Los Angeles and among other activities founded the town of San Clemente, down near the San Diego County line. There was no gas at all in this vicinity, so San Clemente acquired fame as an all-electric village. What happened to this electrical boast when Southern Counties brought in natural gas will be for Charlie Rutledge to tell. If there are no ladies present, he may even quote some of Ole Hansen's picturesque remarks made while discussing the heating of his house by electricity during the first hard winter.

Natural gas is the big topic nowadays wherever gas men congregate. Even in the State of Washington one company has developed a supply and is serving natural gas to four towns. The work and plans of this company, the Northwestern Natural Gas Company, will be told by its manager, R. E. Combs.

Vying with natural gas in current interest is butane, until recently a discarded by-product. Hardly a small town on the Pacific Slope but has been approached by the butane men with a proposal of gas service. It has remained for a gas company to install the first butane plant in the West. F. A. Hough, research engineer of the Southern Counties Gas Company, will describe the many novel features of the Moorpark installation, amplifying greatly on the information given in his article in May *Western Gas*. The possibilities lying in butane plant construction are being studied carefully by many gas companies. The findings of one such study will be discussed by J. H. Gumz, industrial engineer of Pacific Gas and Electric Company.

There are some new wrinkles in Home Service. These will be elucidated by J. Earl Jones, commercial manager of Seattle Gas Company, and Chairman of the Commercial Section of the Association. Miss Bernice Reddington, domestic science expert for the Seattle Post-Intelligencer, will discuss her work, and R. W. Coblentz, sales manager of Washington Gas and Electric Company, will tell how he sells assorted gas appliances by the dozen. Industrial sales will be reported on by Ray Trowbridge; chairman of the Association's committee on that subject, and the Cooperative Advertising Campaign will be opened for discussion by D. L. Scott of Los Angeles, the man who bosses that job for us.

The Technical men and the Accounting men have a great deal to talk about, so parallel sessions have been arranged for Thursday afternoon. At the Technical meeting "Gas Plant Refractories" will be the subject of an address by Gregory Rogers of Gladding, McBean & Co. The Committee on Gas Plant Waste Disposal, headed by N. H. Wardale of Portland, has assembled a great deal of information on this subject from world-wide sources and will present it at this session. Hardwick Barnes, engineer of tests at San Diego, has developed a method of determining very small concentrations of hydrogen sulphide in gas. Mr. Barnes will read a paper on his method. The Accounting Section session, to be held simultaneously with this Technical meeting, will take the form of a round-table discussion of current problems. On another program G. F. Mackenzie of Portland, chairman of the Statistical Committee, Accounting Section, will discuss the important subject of Merchandise Accounting and Budgetary Control.

This is not all, but enough has been given to indicate the earnestness with which the Program Committee has accepted its responsibilities. A complete program will be mailed to all members of the Association about two weeks prior to the meeting. Reservations may be made now with the Olympic Hotel.

Issue Third Cooperative Advertising Bulletin

IN accordance with its policy of keeping the sales and advertising organizations of member companies fully informed as to progress in the Cooperative Advertising Campaign, the committee in charge has issued a third bulletin describing activity during April and May. Among other things, the committee announces that it will carry three advertisements in Western Plumbing and Heating Journal, these appearing in the August, October, and December issues. Each advertisement will feature the activities of some well-known plumber. who is successfully merchandising quality gas appliances. The bulletin also contains the first photograph of the radio baby, Clayton Murdoch Burns. A large number of prints of this photograph have been made and they will be offered to the radio audience by Helen Webster in her talk on June 11.

WESTERN DEVELOPMENT COMPANY TO BUILD IDAHO LINE

Following the announcement that the Idaho Public Utilities Commission has granted a permit to John McFayden and L. B. Denning for the service of natural gas in southeastern Idaho, comes the announcement that the transmission lines will be laid into that territory by the Western Development Company, an Idaho corporation. The lines will be an extension of the Western Public Service Corporation's line to cities in northern Utah, through the Bear River valley into Idaho. Cost of the project is estimated at $3,500,000.

A. R. BAILEY GOES WITH COAST COUNTIES AS GAS ENGINEER

A. R. BAILEY, formerly with the Los Angeles Gas and Electric Corporation, has accepted a position as gas engineer for the Coast Counties Gas and Electric Company, which has headquarters at Santa Cruz. The appointment is effective June 15. Mr. Bailey has been with the Los Angeles company in its distribution department since 1924, and has been active in Pacific Coast Gas Association committee work for a number of years.

A. R. Bailey

BOOKLET ON USE OF NATURAL GAS PUBLISHED BY P. G. AND E.

"Natural Gas, its Development and the Importance of its Utilization," is the title of an interesting 28-page booklet published by the Pacific Gas and Electric Company, designed for distribution among actual and prospective gas consumers.

Feeling the desirability of acquainting the general public with the nature of the new fuel and the extent and range of its usefulness in industry as well as in the home, there is incorporated in the booklet such items as the historical origin of the use of natural gas, its use in the United States, its use in California, its chemical nature, its importance to communities for industrial and domestic purposes, a detailed description of the Pacific Gas and Electric transmission lines, and utilization possibilities.

Company salesmen are furnished with copies of these booklets for distribution to prospects, and district managers mail them to special mailing lists of potential consumers. It is expected that this comprehensive review of natural gas will aid materially in familiarizing natural gas users with the advantages of the new fuel.

EXTENSIONS FROM STANPAC LINE FOR INDUSTRIAL CONSUMPTION

The new 26-inch Standard Pacific natural gas line from Tracy to Pittsburg, Calif., has been completed, and this area is now receiving gas service. A 12-inch extension is being constructed to serve the F. E. Booth Cannery in Pittsburg, in which straight natural gas will be used for fuel on the fish cookers and for heating.

Two other 12-inch extensions are also being constructed in this area by the Coast Counties Co. One will bring gas service to the Great Western Electro Chemical Plant and the Pioneer Rubber Mills, and a second to the United States Steel Corp. plant. The extension line to the F. E. Booth Cannery will also be tapped by the Redwood Mfg. Co. and Johns-Manville Co.

WATER HEATER CAMPAIGN OF COAST COUNTIES SUCCESSFUL

A successful water heater campaign has just been concluded by the Coast Counties Gas and Electric Company, according to Pierre Vinet, new business manager.

With a quota of six water heaters per man, a total of 138 per cent was reached in six weeks time, the winner exactly doubling his quota. Several other men sold as high as 10 heaters and one 11, and every district went over the top.

New Set-up *for* Standard Oil Utility Interests

THE newly formed Standard Engineering and Management Corporation, subsidiary to the Standard Oil Company of California, has announced in a recent statement its readiness to enter into utility operations on the Pacific Coast. Its field of activity will extend over public utility management, engineering and construction work, investigations and appraisals of industrial plants and utilities, and specialization in all phases of gas and electrical operations.

Among the companies operated at the present time by this organization are: Pacific Public Service Co., Coast Counties Gas and Electric Co., California Consumers Co., California Consolidated Water Co., Coast Natural Gas Co., Westside Natural Gas Co., Inland Empire Gas Co., Natural Gas Corporation of California, Natural Gas Corporation of Oregon, and the Natural Gas Corporation of Washington.

The personnel of the Standard Management and Operating Corporation includes a group of executives of exceptional experience in the utility and industrial fields.

E. F. English, executive vice-president of Pacific Public Service Company, is president of the new corporation. He was educated as a mechanical engineer, and has been associated with the utility operating organizations of Sanderson and Porter, J. G. White, Public Service Corporation of New Jersey, American Telephone and Telegraph Company, and in recent years with the General Engineering and Management Corporation as its first vice-president.

E. A. Olsen, director of operations for Pacific Public Service, is vice-president of the corporation, and directs the management and operation of public utility properties.

J. B. Wilson, president of Coast Counties Gas and Electric Company, and a director of Pacific Public Service, has spent 20 years in the utility field, and is thoroughly conversant with load building problems and sales promotion work.

R. N. Dreiman, who was selected as treasurer of Pacific Public Service upon its formation, has been identified with public utility financing and operating projects, as well as corporate and treasury department matters.

Charles Grunsky, chief engineer of the new organization, was with the California State Railroad Commission until November, 1929. Mr. Grunsky is well versed in matters pertaining to rate schedules of all classes of public utilities and particularly to valuations, construction costs, and the development of operating companies.

A. E. Hall, gas engineer for Coast Counties Gas and Electric Company, is now in charge of natural gas pipe line construction for Standard Management and Operating Corporation. For several years Mr. Hall was in charge of construction of gas plants and distribution systems for the Pacific Gas and Electric Company. He was a First Lieutenant in chemical warfare service, and after the War, became associated with the Coast Counties Gas and Electric Company as gas engineer.

CONTINENTAL CONSTRUCTION CO. TO BUILD TEXAS-CHICAGO LINE

ANNOUNCEMENT is made of the forming of the Continental Construction Company under the laws of Delaware to handle the construction of the Panhandle-to-Chicago line, which will be laid by the Cities Service Gas Company, Standard Oil of New Jersey, Insull, Son & Company, the Texas Corporation, Phillips Petroleum Company, Skelly Oil Company, and Columbian Carbon Company.

Temporary offices of the Continental Construction Company were first set up in Chicago, but reports state that they have now been moved to Kansas City, where permanent headquarters have been established in the Professional Building. The offices will be maintained in the fifth and sixth floors of the building.

The company expects to have approximately 100 engineers at the Kansas City office on June 1, at which time active operations will begin. Kansas City was chosen for the permanent location of the company because of its being a central point from which to operate.

From reports, it is thought that the Chicago line will extend almost due north for a distance from the Panhandle fields, and then go north and east to Chicago, instead of taking the most direct route to that city.

Southern Counties *to* Spend $750,000 *for* Holders

SOUTHERN COUNTIES GAS COMPANY, with headquarters in Los Angeles, and operating in five southern California counties, announces as a major item in its 1930 building program, that 21 high pressure gas holders will be constructed throughout its system, at an approximate cost of $750,000. This will bring the total investment of the company for gas storage facilities to $2,248,168, and will give the company a storage capacity of 16,113,000 cubic feet of which 12,963,000 cubic feet will be in high pressure holders. Several of the new holders will be 50 feet in diameter and 100 ft. high, and will be designed for a maximum working pressure of 50 pounds to the square inch. Steel plate of 1-inch thickness is being used.

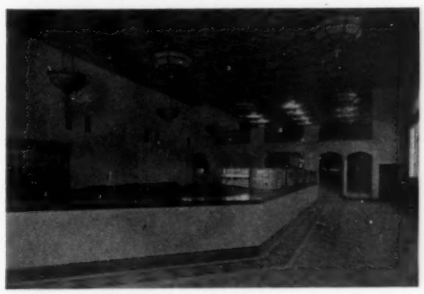
Four of the new units are being constructed in Santa Ana, each having a capacity of 500,000 cubic feet. This will give the Santa Ana station a total storage capacity of 3,150,000, most of which will be in high pressure holders. Cost of these four new units will be $194,000, bringing the capital investment at the station to $366,000.

Eleven new units will be built at Santa Monica, at a cost of $226,000, the total investment for gas storage in this district reaching $625,000 upon completion of the new holders. These units will be 32 feet in diameter and 87 feet high, each having 187,000 cubic feet storage capacity, making a total of 2,057,000 cubic feet in high pressure storage capacity for the station, or an aggregate of 4,457,000 cubic feet for high and low pressure storage.

San Pedro and Pomona will each have two new units, with storage capacity of 500,000 cubic feet each, giving a total of 2,000,000 cubic feet storage capacity to both stations. Cost of these four holders will be $190,000, or $47,000 per unit. Upon completion of the new holders, San Pedro and Pomona will each have an investment of $225,000 in high pressure storage facilities.

Two new units will be built at Ontario, representing an investment of $97,000, and adding 1,000,000 cubic feet to the existing total, bringing the capacity in that district to 1,500,000 cubic feet.

A. F. Bridge and M. R. Thompson, vice-presidents of the company, are responsible for the development and design of this new type of gas holder which has been adopted by Southern Counties throughout its entire system.



Pasadena gas offices combine beauty and utility.

New Pasadena Structure *for* L. A. G. *and* E.

THE new district office of the Los Angeles Gas and Electric Corporation at Pasadena, California, recently completed at a cost of $275,000, is of Italian Renaissance design, two stories in height, with basement and mezzanine floor. As pictured above, its exterior is faced in terra cotta, of limestone coloring, and artistically designed scraffito work. The roof is of red tile, and the building forms an harmonious unit in Pasadena's new civic center, all buildings of which are in California-Spanish style of architecture.

General offices of the company occupy the first floor of the new building, while the mezzanine floor is given over to an attractive display of gas appliances. Provision has also been made for additional display space in the basement. The company, while not selling appliances, cooperates with dealers and manufacturers in their display and demonstration.

An interesting feature is the main auditorium on the second floor, which has been equipped with a demonstration platform and kitchen for cooking school and lecture purposes.

Since the purchase by Los Angeles Gas and Electric Corporation of the Pasadena Consolidated Gas Company in 1909, company mains in the district have increased 450 per cent, the number of meters has increased 440 per cent, and there has been an increased gas consumption of about 803 per cent. James F. Tickner is manager of the Pasadena office for the company, and acted as host to visitors on the occasion of the formal opening of the new building.

NINTH ANNUAL CONVENTION OF NATURAL GASOLINE ASS'N.

The Ninth Annual Convention of the Natural Gasoline Association of America was held at the Mayo Hotel, Tulsa, Oklahoma, May 20-22.

With *the* Metermen

The Pressure *and* Meter Controlled Area *in a* Gas Distribution System

By M. J. CEREGHINO

*Los Angeles Gas and Electric Corporation**

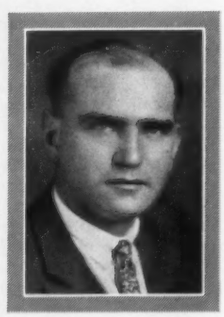
THE primary object of any utility distributing gas to a community is to render the consumer a satisfactory service for the lowest possible cost. In order to accomplish this goal a great many factors have to be taken into consideration.

First of all, the utility must have an adequate supply of gas available at all times. This was formerly taken care of by manufactured gas. In our own particular territory manufactured gas was almost entirely produced from oil gas. In late years however, the use of straight natural gas has gradually replaced manufactured gas so that in a comparatively short time the greater portion of California will be supplied with natural gas.

Secondly, a sufficient number of transmission, trunk and feeder lines must be had in order to supply a satisfactory pressure at all times throughout the entire distribution system. In this connection it is necessary to maintain a compressor plant capable of pumping high pressure gas into the mains from storage reservoirs.

In order to render a satisfactory service and likewise in order to have an intelligent understanding of the workings of a large distribution system, it becomes necessary to divide the system into districts, which may be called controlled areas. These districts may be divided into two groups, namely, high and low pressure. In a high pressure area, a controlled pressure from 5 pounds up to 15 pounds is generally maintained. It then becomes necessary to install individual regulators at each consumer's meter to reduce the pressure to a fixed standard, ordinarily around 8 inches of water pressure.

The second method of control is to reduce the pressure in the entire area to 8 or 10 inches pressure, thereby eliminating the necessity for individual house regulators. The choice of methods to be used depends upon many factors, size of mains, probable growth of area and demand. This is beyond the scope of this paper and will not be discussed further.



M. J. Cereghino

The controlled area is a very important factor in the study of the present and future needs of a distributing system. Consider for instance, the system of the Los Angeles Gas and Electric Corporation, with some 350,000 individual gas consumers and 2,900 miles of main. Unless some intelligent layout of transmission mains and suitable controlled areas were planned it would be impossible to adequately serve the needs of such a large community.

The controlled areas vary considerably in size and number of meters. The general average is approximately 2,500. In planning a controlled area a study of the proposed district is first made. It is of course fed from one location only, although emergency tie-ins are always provided from other districts whenever possible. The chief reasons for the controlled area are as follows:

(1) A controlled pressure lower than the transmission line pressure.

(2) A check on the actual leakage in that area.

(3) Minimum hour consumption which gives a check on large leaks in controlled area.

(4) Maximum hour consumption which gives a check on whether the mains are large enough to supply the consumer properly, with a satisfactory pressure at all times.

There are numerous other reasons that may be given; however, these mentioned above give some idea as to the advantage

*Presented before the Southern California Meter Association, May 22, 1930.

Metermen Stage Visitors Night *at* May Session

VISITORS Night was observed by the Southern California Meter Association at its monthly meeting of May 22. Special invitations were extended to executives and engineers of a number of companies, to attend the dinner and meeting, and a number were present. T. K. M. Smith of the Industrial Fuel Supply Company acted as chairman of the reception committee.

Introducing the business session, a statement prepared by Mr. Smith, who served as first president of the S.C.M.A., was read by President R. F. Angell, reviewing highlights in the organization's development. Formed in July, 1927, with an original membership of 12, the S.C.M.A. now has grown to a list of 237 members.

A program of high order was arranged by Chairman Ralph Cook of the Program Committee. P. W. Hill, General Petroleum Corporation, presented a paper on "Pressure and Temperature Control in Gasoline Absorption Plants," which developed a spirited discussion of the practical side of control methods and equipment. E. R. Ragatz, distillation engineer for the Union Oil Company of California, led this discussion.

A paper by M. J. Cereghino of the Los Angeles Gas and Electric Corporation, on "The Pressure and Meter Controlled Area in a Gas Distribution System," followed that by Mr. Hill. Mr. Cereghino's paper was illustrated by slides showing design of meter and regulator set-ups, gage boxes, etc.

Reporting on the monthly golf tournament, Malcom Miller of the Entertainment Committee awarded the S.C.M.A.-*Western Gas* Good Fellowship Trophy for the month to E. Lorenz of the Southern California Gas Company. A. J. Brunner, McMillan Petroleum Corporation, took the second prize and C. J. Warren, General Petroleum Corporation, the third. Second and third prizes were merchandise gifts provided through the courtesy of the Midwest Piping and Supply Company.

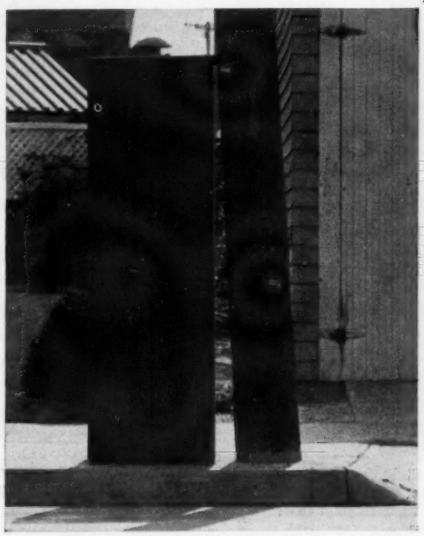
Announcing that a number of gadgets are already in hand for the Association's second contest, E. Lorenz of the Gadget Committee urged members to submit their entries in order to be eligible for the prize awards soon to be made.

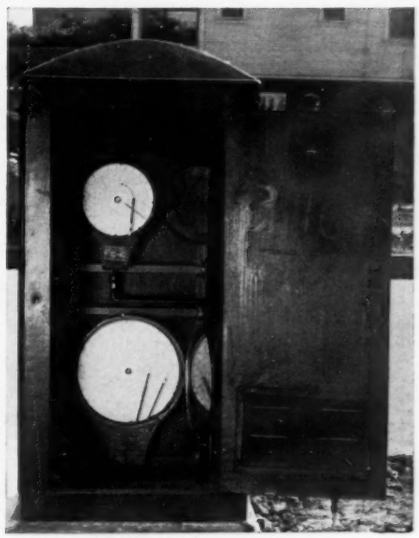
L. P. W. Des Brisay, chairman of the Educational Committee, stated that the fifth lesson in the Extension Course on Gas Measurement has been mailed to students, and that the sixth lesson set was to be mailed late in May. Lessons 7 and 8 are also ready for mailing. Enrollments in the course now total 132.

Elections Due *at* Coming June Meeting

Annual elections to determine leadership for the Southern California Meter Association's fourth year of service are due for the June meeting, which will be held at the Breakers Hotel in Long Beach. There will probably be one paper on the program in addition to the election, and arrengements are under way for something unusual in the way of entertainment.

A nominating committee has been active in the selection of candidates for the various Association offices. M. J. Cereghino is chairman of the committee, with H. A. Hurley, J. A. Swindle, J. R. McLaughlin and C. W. Brockman, completing the membership.





LEFT: First meter box used. Contrast this with next view. CENTER: This highly presentable meter box, designed by L. A. G. and E. distribution department, houses gages and also serves as vent for regulator manhole. RIGHT: Showing gage set-up in present design of meter box.

of meter controlled area. Thus we can see that while a controlled metered area gives a regulated pressure on any particular district as well as the quantity of gas lost in leakage in that district every day, it goes still further.

If records from any corresponding month of the current year are compared with those of a year ago, a study can be made of the increase in load and likewise of the nature of the load. Knowing this it then becomes an easier task to calculate the necessary extensions of mains in any particular district.

The chief disadvantage to the controlled area is that all the gas supplied to any district is dependent entirely on one source of supply. From a distribution standpoint this does not seem objectionable; however, from the standpoint of safety to the consumer it does seem to have quite a bearing on the case.

A partial solution to this would be either to have emergency feeds which automatically feed into the area when the pressure is reduced to a definite pressure, or better still, to have a second and distinct feeder supplying the same metered area at all times from another source.

Whether or not it will be necessary to do this depends entirely on local conditions and the extent to which the utility deems it advisable to safeguard the service to the consumer.

Table No. 1 presents a brief summary of the condition of the high and low pressure gas mains of the Los Angeles Gas and Electric Corporation as of September, 1929:

Of the high pressure controlled areas 659.4 miles are under metered control, while 618.3 miles are merely under pressure control.

The average meter controlled area consists on an average of about 2,500 consumers. The feeder line from the main transmission line consists of a 6-inch line which is led to a manifold consisting of two 4-inch high pressure regulators. A standard regulator hook-up has been designed which is used on all district set-ups. Besides the two regulators it is provided with a suitable dust trap and the necessary by-passes. The en-

TABLE NO. 1

Classification	*Miles of Main*	*Per cent of Total*
High pressure trunk and transmission	188.0	6.48
High pressure controlled through regulators	1277.7	44.08
High pressure to be controlled	214.1	7.38
Low pressure	1219.5	42.06
	2899.3	100.00

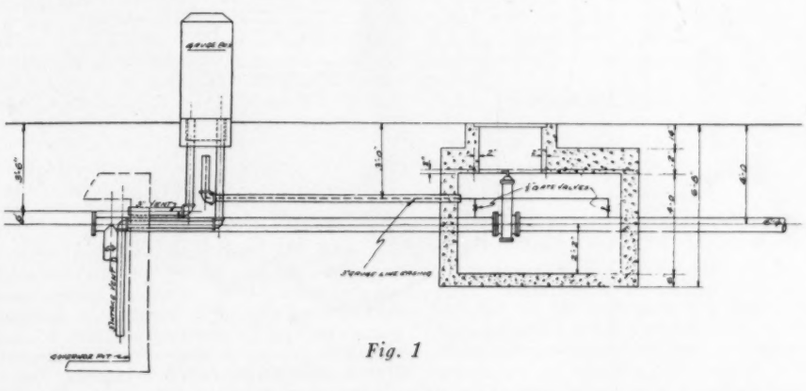


Fig. 1

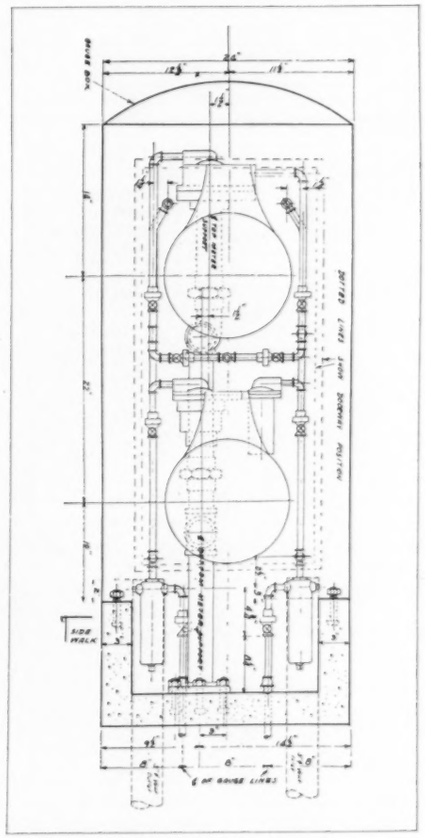


Fig. 2

STATISTICAL DATA OF TYPICAL METERED DISTRICT

Data from Gas Distribution Department, Los Angeles Gas and Electric Corporation

Period 1929	No. Consumers	Orifice meter Consumption	Actual Peak Hour	Calculated Peak Hour	Demand per Consumer	Demand per Ft. of M'n.	Cost of Main per Meter	Cost per Mile of Main	Cost per Pk. Hr. 1000 Cu. Ft.	Factor
January	2411	12,525,700	45,612	52,190	22	.67	32.75	5369.77	1512.47	275
February	2409	11,326,500	52,384	47,194	20	.61	32.75	5369.77	1672.58	216
March	2410	10,398,200	45,098	43,326	18	.56	32.75	5369.77	1821.90	231
April	2403	9,099,200	40,726	37,913	16	.49	32.85	5369.77	2082.02	223
May	2409	5,874,700	22,095	24,478	10	.32	32.77	5369.77	3224.76	266
June	2402	5,086,000	19,989	21,192	9	.27	32.86	5369.77	3724.78	254
July	2327	4,265,600	13,332	17,773	8	.23	33.92	5369.77	4441.32	320
August	2334	3,812,200	12,880	15,884	7	.21	33.82	5369.77	4969.50	296
September	2353	4,323,100	23,161	18,013	8	.23	33.55	5369.77	4382.15	187
October	2389	5,188,100	32,126	21,617	9	.28	33.04	5369.77	3651.55	161
November	2417	7,930,500	40,842	33,044	14	.43	32.66	5369.77	2388.80	194
December	2418	9,271,300	41,295	38,630	16	.50	32.64	5369.77	2043.38	225

UNACCOUNTED—FOR GAS IN TYPICAL METERED DISTRICT

Data from Gas Distribution Department, Los Angeles Gas and Electric Corporation

Period 1929	District Meter	Consumer's Meters	Loss Cu. Ft.	% Loss	Miles Main	Loss per Mile per Month	No. Meter	Loss per Meter	Loss per Mile 3 inch Basis
January	12,525,700	11,859,100	666,600	5.3	14.7	45,347	2411	276	33,497
February	11,326,500	10,426,000	900,500	8.0	14.7	61,259	2409	374	45,251
March	10,398,200	9,738,200	660,000	6.3	14.7	44,898	2410	274	33,166
April	9,099,200	8,131,700	967,500	10.6	14.7	65,816	2403	403	48,618
May	5,874,700	5,343,000	531,700	9.1	14.7	36,170	2409	221	26,719
June	5,086,000	4,555,700	530,300	10.4	14.7	36,075	2402	221	26,648
July	4,265,600	3,768,100	497,500	11.7	14.7	33,844	2327	214	25,000
August	3,812,200	3,447,200	365,000	9.6	14.7	24,830	2334	156	18,342
September	4,323,100	4,000,400	322,700	7.5	14.7	21,952	2353	137	16,216
October	5,188,100	4,908,400	279,700	5.4	14.7	19,027	2389	117	14,055
November	7,930,500	7,522,300	408,200	5.1	14.7	27,769	2417	169	20,513
December	9,271,300	9,005,500	265,800	2.9	14.7	18,082	2418	110	13,357

Table No. 2

tire hook-up is placed in a concrete vault generally located in a parkway. The vault is provided with a vent which is connected with the meter gage box above the street level. For metering purposes, it has been the general practice to use an orifice meter set-up, although a positive type meter may be used to advantage provided it is equipped with a recording chart in order to give an hourly record of the flow.

It has been found advantageous to install the meter set-up after the regulator for several reasons: First of all, a constant pressure on the orifice meter chart simplifies the calculations. Secondly, a record of the regulated pressure is obtained on the orifice chart and consequently does away with the necessity for an additional recording gage. Finally, a constant pressure makes it possible to obtain a better minimum reading on the chart for the same maximum reading, the differential pressure being the only variable affecting the operation of the meter.

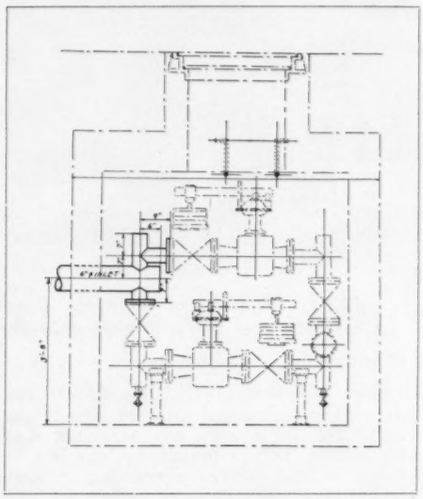
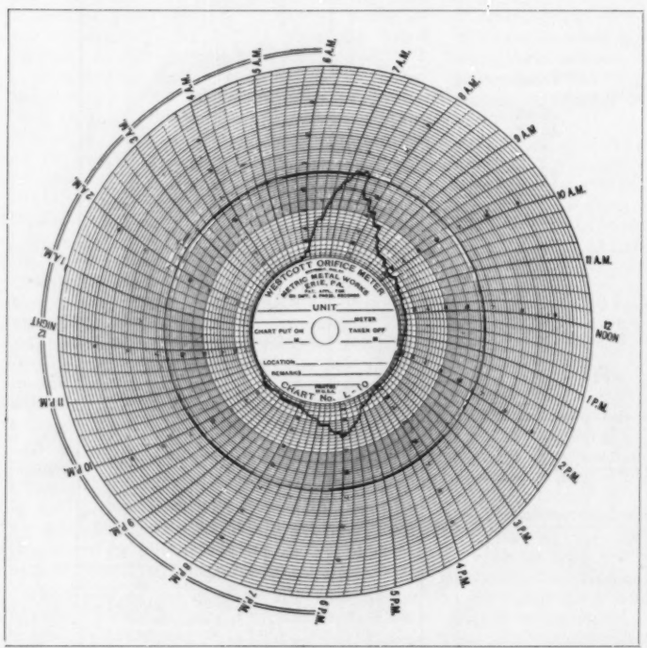
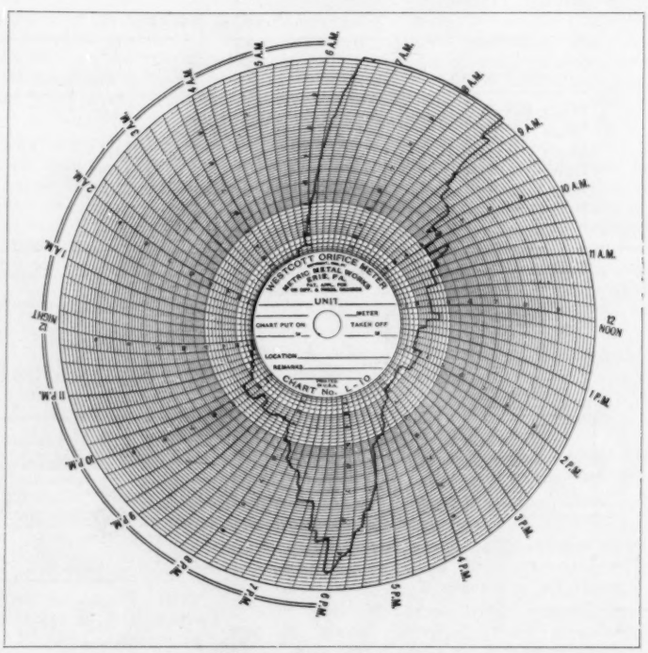


Fig. 3

The chief objection to the orifice meter on the low side of the regulator is that the drop



50-inch differential meter.



10-inch differential meter.

Fig. 4. Typical charts from a duplex orifice meter installation.

through the orifice on peak loads produces an appreciable drop in the line pressure. For instance, where a pressure of 5 pounds is carried on a district, a drop of 41 inches on the orifice meter will produce a drop of 1½ pounds or reduce the line pressure to this objection is to carry a high enough pres- 3½ pounds. The only practical solution to sure after the regulator to insure a suitable line pressure for peak load conditions.

The problem of obtaining a satisfactory minimum hour reading and still not have an excessive peak hour differential was accomplished by using a combination 10-inch and 50-inch differential meter set-up. We have found it necessary to install this combination hook-up on all of the metered districts, as the variation between the minimum and peak hour load is so great that it is impossible to secure an intelligent record on one gage alone. Even with the combination set-up it is necessary to change the size of the orifice plate several times when going from the summer load into the winter load.

The square root chart is used on both gages, thereby speeding up the caluculations of the charts. A chart changer covers the entire system daily and so times his travel as to change the charts as near as possible at the same time each day. The charts are then brought in and calculated by a reader at the office. A record is made of the minimum hour, the peak hour and the total consumption each day. Any unusual records on the chart, such as an unusually large minimum hour or a sudden increase or decrease in the pressure, are noted and immediately reported to the proper authorities, in order that the trouble may be remedied.

Fig. 1 shows a general layout of the governor pit, orifice fitting pit, and gage box.

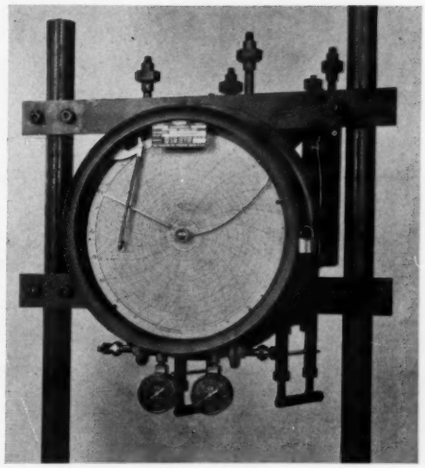
The design of a suitable gage box was a problem of considerable importance. Frequently, it was necessary to re-install the gages in areas where an unsightly gage box would be a very objectionable feature. After considerable work a very satisfactory meter box was designed. The box resembles in appearance, the old familiar mail box and frequently it is mistaken for one by people who are in a hurry to mail a package or letter. The fact that it so closely resembles a mail box, however, is a splendid point in its acceptance at almost any location on the curb of our streets, without any apparent objection from the general public. In addition to housing the gages, the meter box also acts as a vent to the regulator manhole. Fig. 2 shows detail of the meter box construction. Fig. 3 gives governor pit detail, showing duplex regulator set-up.

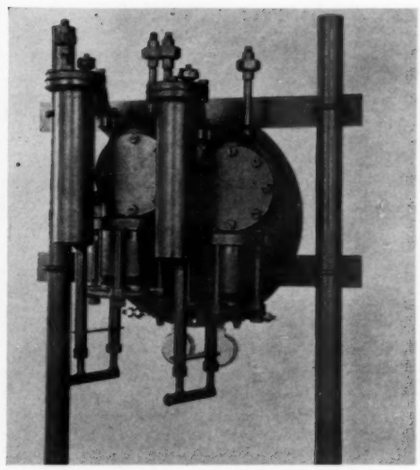
The accompanying charts (Fig. 4) are typical records from the district meters and show the large variation between the minimum and peak hours.

The compilation and interpolation of the data obtained are very important, and in order to make this as simple as possible two forms have been worked out which give all the information that is necessary to figure the various needs for which these data may be used. Table No. 2 shows two typical sheets giving the various records that are compiled on each district set-up.

The results obtained from the meter controlled areas have proved very beneficial and seem to justify the expense of installation.

In closing, the author wishes to state that the data and design of the regulator and meter set-up were furnished by the gas distribution department of the Los Angeles Gas and Electric Corporation. This department spent considerable time in the development of this problem and the results obtained appear to justify the time and money spent.





LEFT: Front view of flow ratio controller. RIGHT: Rear view.

Foxboro Introduces Flow Ratio Recorder-Controller

THE Foxboro Company of Foxboro, Massachusetts, has developed a new controller to keep the flow of two liquids in direct proportion to one another when one of these fluids is an uncontrolled variable.

The flow ratio recorder-controller combines features of the Foxboro flow meter with features of the Foxboro flow controller. It is two instruments in one, so connected that the rate of flow of one fluid, as measured by the flow meter, controls the rate of flow of the second fluid. The flow meter constantly readjusts the control point of the flow controller.

For example, in an absorption plant an orifice plate is placed in the rich-gas line to the absorption tower and the flow is measured. A controlled valve is placed in the lean-oil line and the flow of lean-oil is controlled in direct ratio to the flow of rich gas. A ratio controller may also be used to control the ratio of steam to fat-oil, in the steam still.

The new Foxboro flow ratio recorder-controller finds application in a wide range of processes where it is essential to maintain a constant flow ratio between two fluids, one of which is an uncontrolled variable.

HALL AND KILFOYL NOW WITH STANDARD MANAGEMENT

Announcement has been made by J. B. Wilson, president of the Coast Counties Gas and Electric Company, of the promotion of A. E. Hall, gas engineer, to a similar position with the Standard Management and Operating Corporation.

Mr. Hall has been with Coast Counties Company for the past 11 years, moving his headquarters to Santa Cruz when the general offices were brought from San Francisco.

Mr. Wilson also announced the promotion of J. B. Kilfoyl from the post of gas foreman of the Coast Counties system to the position of construction superintendent for Standard Management and Operating.

Mr. Kilfoyl has been with the Coast Counties since 1907, and was in charge of the original construction of the gas system in Contra Costa County properties of the company.

Mr. Hall and Mr. Kilfoyl will be in charge of the various construction jobs of the company in its program of expansion and development throughout the entire Pacific Coast.

STUDENTS GET COPIES OF RAPID CALCULATOR FROM N. G. E.

Natural Gas Equipment Inc., of Los Angeles, recently sent to each of the students enrolled in the Southern California Meter Association's extension correspondence course in the measurement of gas, a rapid flow calculator for Anubis differential pressure recorders and other types of orifice meters.

F. L. BLANCHARD TO SPEAK AT P.A.C.A. CONVENTION

Frank Leroy Blanchard, director of advertising for Henry L. Doherty & Co. and the Cities Service Company, is one of the principal speakers on the program of the 27th Annual Convention of the Pacific Advertising Clubs Association, to be held at Spokane, Wash., June 22-25, 1930.

W. E. GENTNER LEAVES ON TRIP TO ANNAPOLIS

W. E. Gentner, district superintendent of the Southern Counties Gas Company at San Pedro, Calif., left late in May for Annapolis, Md., to witness his son's graduation from the naval academy. Mr. Gentner will go on to New York and will stop in Chicago on his return to the west coast.

HEAVENER AND HOWE, OKLAHOMA, SOON TO HAVE NATURAL GAS

The Junior Gas Company, of which George F. Collins of Sapulpa is president, is preparing to begin gas service in Heavener and Howe, Oklahoma. Gas will be delivered to the towns through a 6⅝-inch gas line that has been constructed from wells in the Poteau gas field.

ANNUAL BARBECUE PLANNED FOR SO. CAL. METER ASS'N

Plans are now forming for the S. C. M. A. Annual Barbecue, which will be held early in September. M. R. Miller, chairman of the Association's Entertainment Committee, is in charge of arrangements.

Pacific Lighting Line *to* So. California Rumored

PRESS statements current late in May carried reports of surveys conducted by the Pacific Lighting Corporation for a gas transmission line from Kettleman Hills and Buttonwillow fields in the San Joaquin Valley, to augment supplies of the corporation's three operating companies in southern California.

According to the press accounts, directors of Pacific Lighting were reported to have under consideration the issuance of $15,000,000 in bonds to finance construction of the contemplated line.

One line route extending down the San Joaquin Valley, and another directed from the fields to the coast and thence southward were reported to have been surveyed, the first involving an estimated line cost of $16,000,000, and the second of $18,000,000. Pipe of 16-inch diameter was said to be contemplated.

MONTANA-DAKOTA UTILITIES TO OPERATE BISMARCK LINE

Montana-Dakota Utilities Co. is applying to the North Dakota Railroad Board for permission to issue $4,500,000 in bonds to cover the cost of laying a 190-mile natural gas transmission line from the Cabin Creek field in eastern Montana to Bismarck, North Dakota. About 22 towns would receive natural gas service from the line.

The State Railroad Board has approved the assignment by the Montana-Dakota Power Company of the franchises and certificates of convenience for operation in North Dakota towns to the Montana-Dakota Utilities Co. This latter company has also purchased the holdings of the Black Hills Utilities Company.

Construction work on the Montana-Bismarck line is under the direction of Hope Engineering Company, and the work will be completed in about three months. Twelve-inch pipe is being used.

"ROMANCE OF NATURAL GAS" NOW TRANSLATED INTO PORTUGUESE

A paper, "The Romance of Natural Gas," by A. E. Strong, general superintendent of Coast Counties Gas and Electric Company, has been translated into Portuguese and released through a Brazilian newspaper syndicate, according to Jerry Barnett, formerly of Coast Counties, who is now in Rio de Janeiro.

1930 Calendar

Southern California Meter Association—Los Angeles, Calif., June 26, 1930.

Canadian Gas Association—Halifax, Nova Scotia, June 24-25, 1930.

Annual Northern Conference Pacific Coast Gas Association—Seattle, Wash., June 26-27, 1930.

Pacific Coast Gas Association—Huntington Hotel, Pasadena, Calif., September 9-12, 1930.

American Gas Association—Municipal Auditorium, Atlantic City, N. J., October 13-17, 1930.

J. E. KUHNS MANAGER FOR COOS BAY GAS CO. AT MARSHFIELD

J. E. Kuhns, formerly manager of the Northwest Cities Gas Company at Astoria, Ore., is now manager of the Coos Bay Gas Company at Marshfield, operated by Northwest Cities. He takes the place of Arthur Anderson, who has been transferred to Pendleton, Ore., as district manager of the Northwest Cities Gas Company.

Mr. Kuhn's transfer to Marshfield resulted from the resignation of R. E. Gaut, who has been district manager at Pendleton since Northwest Cities Gas Company took over the property in February, 1929. Mr. Gaut resigned to accept a position with the Shell Oil Company in the Shelane Department.

INERTOL OPENS BRANCH OFFICE AT SAN FRANCISCO, CAL.

Inertol Co., Inc., of New York, announces that a branch office has been opened at 447 Sutter Street, San Francisco, in the Division Building of the Pacific Gas and Electric Company. B. W. Mueller, who has been Pacific Coast representative for the company, is named Western manager.

LONE STAR ISSUES RIGHTS TO PURCHASE COMMON STOCK

Mailed under the date of May 1, 1930, the Lone Star Gas Corporation has issued rights to stockholders of record, May 31, 1930, to purchase one share of the common capital stock of the company at $22.50 per share for each six shares of common stock held by the stockholder.

CONSUMERS TO SELL PROPERTIES TO COAST COUNTIES G. AND E.

Consumers Gas Company, with headquarters in San Francisco, has applied to the California Railroad Commission for authority to sell its properties in the towns of Gustine, Los Banos and Dos Palos, to the Coast Counties Gas and Electric Company.

S. W. UTILITIES SERVES WHON, TRICKHAM AND SIBLEY

Southwest Utilities Corporation with headquarters in Fort Worth, Texas, is serving Whon and Trickham in Texas, and Sibley, Louisiana, in addition to the towns named in the company's report in the May issue of *Western Gas*.

SOUTHERN UNION GAS CO. OPENS NAVASOTA, TEXAS, OFFICE

The Southern Union Gas Company, with headquarters at Dallas, Texas, has opened an office in the Lott building in Navasota, Texas, with C. A. Coughlin as manager. Mr. Coughlin was transferred to Navasota, which is now being served gas by the Southern Union, from Brenham, Texas.

E. A. WESTON WITH THEBO STARR & ANDERTON

E. A. Weston, who has been associated with Western public utilities for a number of years, has recently joined the staff of Thebo Starr & Anderton, engineers. Mr. Weston is serving in the capacity of division superintendent of construction in Southern California.

H. G. SCOTT ELECTED DIRECTOR OF ALLEGHENY GAS CORP.

H. G. Scott, president of Union Management & Engineering Corporation and president of the Memphis Natural Gas Company and of the Appalachian Gas Corporation, has been elected to the directorate of the Allegheny Gas Corporation.

Arizona Industries Line Up *for* Natural Gas

AS *Western Gas* goes to press we have news in hand to the effect that the Phelps Dodge Corporation and the Calumet & Arizona Copper Company have contracted with interests which control gas coming from Lea County, New Mexico, by way of El Paso, Texas, for fuel requirements of Arizona copper smelters. These developments substantiate rumors current for the past two months that natural gas was in prospect for Arizona industries and population centers. The reports indicate that construction of the gas transmission line will proceed at once, to make natural gas available by about the first of the year.

It is rumored that Electric Bond & Share Corporation interests are behind this project, which involves constructing another major unit in the gas transmission system of the West and links another state into the natural gas empire. Undoubtedly the line will be continued as far as Phoenix and will cover the domestic and industrial requirements of Douglas, Bisbee, Tucson and Phoenix, as well as serving the fuel load of the copper industry at Globe and Miami. It is estimated that more than 900 miles of line will be called for in the project.

Natural gas for Arizona means a tremendous stimulus to the basic copper industry and to other enterprises dependent upon the State's rich natural resources. Cement and gypsum industries will be among those to benefit. Fuel savings will come as a boon to the copper operators, now facing keen price competition from abroad. Arizona's population is showing a marked current growth, which will accelerate as natural gas becomes available.

CITIES SERVICE PLANS LINE TO MISSOURI TOWNS

Cities Service Gas Company has announced the construction of a 100-mile, 10-inch gas transmission line that will extend from Ottawa, Kansas, to Harrisonville, Warrensburg, Knobnoster, Holden, Higginsville, Pleasant Hill, Sedalia, and other Missouri towns.

The company now serves artificial gas at Sedalia through a subsidiary, the City Light and Traction Company. The construction of the line will be begun at once and rushed to completion so that gas may be supplied the cities in the early fall months.

At Ottawa the line will feed from the main line of the Cities Service extending from the Panhandle fields.

NATURAL GAS UTILITIES CO. OPERATES IN OKLA. TOWNS

Collinsville, Okla., has voted a 25-year gas franchise to the Natural Gas Utilities Company. The natural gas distribution systems in the towns of Collinsville, Skiatook, and Sperry, Okla., were recently taken over by the Natural Gas Utilities Company, with district offices at Collinsville, according to C. D. McConnell, district manager. These properties were formerly operated as the Collinsville Gas Company, the Skiatook Service Company and the Sperry Service Company.

COAST COUNTIES AUTHORIZED TO SELL $4,000,000 BONDS

Coast Counties Gas and Electric Company, with headquarters in Santa Cruz, California, has been authorized by the State Railroad Commission to issue and sell $4,000,000 in first mortgage 5 per cent, 30-year gold bonds, for the purpose of financing additions and betterments to the company's system.

Another Large Carrier *for the* Middle West

ANNOUNCEMENT was made May 27, by Missouri-Kansas Pipe Line Co., with headquarters in Chicago, Ill., that contracts have been released for immediate construction of a $40,000,000 natural gas pipe line, 1,250 miles long, running from the Panhandle field in Texas to Indiana, via Kansas City; Springfield, Ill.; Terre Haute and Indianapolis, Indiana, and connecting with the company's Kentucky pipe line system at a point near Evansville, Indiana. This will bring natural gas to many industrial communities in Kansas, Missouri, Illinois, Indiana and Kentucky.

Illinois Power & Light Corporation and the Missouri Power & Light Company, subsidiaries of the North American Light & Power Co., have contracted with the Panhandle Eastern Company, subsidiary of Missouri-Kansas Pipe Line Co., for the purchase of natural gas for all the cities in Illinois and Missouri which they now are serving with manufactured gas.

Necessary financing has been arranged for, according to Frank P. Parrish, president of the company, and construction has been started at two points on the line in Texas and Missouri. Additional gangs are being put to work at several other points, looking toward completion by December 1.

Approximately $25,000,000 worth of pipe and other material has been ordered from the National Supply Co. of Toledo, Ohio.

San Diego Utility *in* Water Heater Sales Promotion

ABOVE is shown the display of water heaters used by the San Diego Consolidated Gas & Electric Company in stimulating an interest in automatic gas water heating during April and May. James B. Willey, the gentleman in the picture, has been very successful in obtaining prospects through an offer of a free water heater. Although the San Diego utility does not sell gas appliances, the cooperative effort exemplified in this display, and carried out in newspaper advertising as well, is producing definite load-building results.

FLANDERS SUCCEEDS DAZEY WITH SO. OREGON GAS CORP.

K. I. Dazey, general manager of the Southern Oregan Gas Corporation, with headquarters at Medford, Ore., is leaving that office on June 1 to become managing director of the Pacific Coast Electrical Association, and also managing director of the California Electrical Bureau. While he leaves for San Francisco on June 1, his new position officially becomes effective on July 1.

W. W. Flanders succeeds Mr. Dazey to the general managership of the Southern Oregon Gas Corporation.

PUBLIC UTILITIES ADVERTISING ASS'N. IN ANNUAL SESSION

Public Utilities Advertising Association met in annual session at Washington, D. C., May 20 and 21.

The program for the meeting, as announced by Louis D. Gibbs, of Boston, Mass., president of the Association, consisted of addresses on the general topics of "Our Messages for the Public," "The Public's Right to Information from the Utilities," and "The 'How' of Utility Advertising."

FRANCHISES GRANTED IN IOWA FOR SERVICE OF BUTANE GAS

Skelly Oil Company has secured gas franchises in a number of towns in Iowa, according to recent press reports. Among these communities are Spencer, Jefferson, Osage and Tama. The company proposes to construct distribution systems for the supplying of butane gas.

SOUTHWESTERN P. & L. CO. ISSUES $700,000 IN BONDS

Southwestern Power & Light Company, owning public utility properties in southwestern Oklahoma, has authorized an issue of $700,000 in 1st mortgage 5 per cent gold bonds series B at 93 to yield 5½ per cent.

LONE STAR SHOWS GAS SERVICE MAINTENANCE ON FILM

A motion picture recently taken by the Lone Star Gas Company illustrates the bringing of gas from the wells to the consumer, showing the amount of equipment and the number of men necessary to maintain gas service.

A part of the picture shows James A. Martin, chief dispatcher of the company, and Gordon Putnam, giving orders to step-up the gas pressure upon receiving word that a cold wave was coming. Compressor plant scenes are also shown.

The Dallas gas shops and the "hot shot" wagon running on an emergency call also appear in the picture, which will be shown before luncheon clubs and at various public functions.

W. C. Grant, advertising manager of the Lone Star Gas Company and R. G. Soper, vice-president of the Dallas Gas Company supervised the filming of the picture.

BILLINGS GAS CO. TO SPEND $75,000 ON SYSTEM

Expenditures of more than $75,000 are to be made in improving facilities of the Billings Gas Company, Billings, Mont., and the Gallatin Gas Company of Gallatin, according to Charles E. Moore, manager of the Billings Gas Company.

Projects include relaying of gas mains, renewing pipe line between Bridger and Elk Basin, and the rehabilitation of equipment.

CITIES SERVICE COMPLETES LINE TO OKLAHOMA CITY FIELD

Announcement is made of the completion by the Cities Service Gas Company of its 20-inch gas line from a point 15 miles south of Perry, Oklahoma, to the Oklahoma City gas field. The line is 38 miles long and is an extension of the company's line running southward from Dilworth, Oklahoma.

SO. CITIES DISTRIBUTING CO. MOVES OFFICES

Southern Cities Distributing Company, subsidiary of the Arkansas Natural Gas Corporation, has announced plans for the removal of its offices from the Slattery Building, Shreveport, to the Ardis Building, where the headquarters of the Arkansas Natural are maintained.

Announcement is also made by the company of the establishment of a New Business Department. Plans for this department will be consummated upon removal to the new quarters where sufficient space will be provided for the displaying of gas appliances. The company expects to be settled in its new offices about June 1. Paul F. McBride is general manager of Southern Cities and F. S. Kelly is general superintendent.

W. T. MUNN GETS FRANCHISE AT HEBER SPRINGS, ARK.

The city council of Heber Springs, Arkansas, has granted a gas franchise to W. T. Munn, associated with the Cosden Oil Company. This company is now drilling a test well 10 miles south of Heber Springs to ascertain if gas is present in sufficient quantities for supplying the city.

SOUTHWEST GAS CO. BUYS GAS PROPERTY AT ALLEN, OKLA.

Announcement is made of the recent purchase of the Allen Gas Company of Allen, Okla., by the Southwest Gas Company, a Belchic & Laskey property serving gas at Ada, Francis, Seminole, Maude and other Oklahoma towns.

SO. CALIFORNIA GAS CO. BUYS MADERA GAS CO.

Southern California Gas Company, of Los Angeles, has been authorized by the state Railroad Commission to purchase the Madera Gas Company, of Madera, California. The purchase price was named at $83,000.

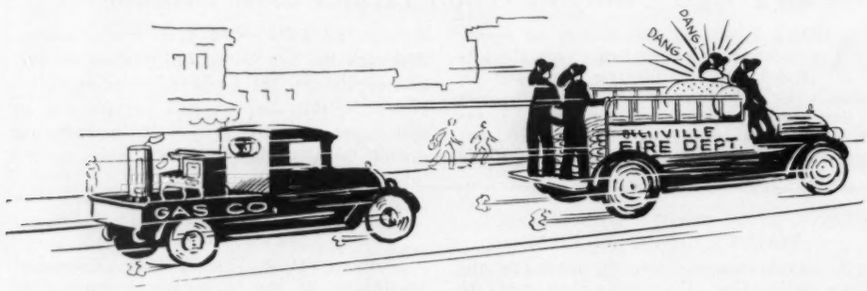
SALES WRINKLES

"He Gains Wisdom in a Happy Way Who Gains it by Another's Experience"... PLAUTUS

Be a Big Shot with the Bucket Brigade

IN the legal profession the "ambulance chaser" is an established character—representing the lawyer who is on the spot 10 seconds after the accident to proffer his card to the injured party.

Now comes the fire truck chaser from the ranks of gas appliance salesmen. Mr. Dovey has a creditable average of actual sales to show from his "fire calls", which makes his story a good one. He tells it as follows:



"I make a practice of going to every fire in my territory. Sometimes the fire is out when I get there, and sometimes I get there in time to help the firemen. In practically every instance the fire is caused by something other than gas, but I tell my sales story just the same.

"In making my calls I always go as an inspector, checking on the gas. This gives me ready entrance to the home, where I am in a position to render real aid in inspecting the condition of gas service, even though I may fail in my sales mission.

"When the fire has been caused by obsolete appliances (no matter what fuel they burn), I have a strong entering wedge for a sale. I point out the difference between the old appliance and our modern one.

"I don't always make a sale, but the average is high enough to make it well worth while. And since I make these calls in the role of an inspector, I leave the owner with the thought that the gas company is interested in his safety and welfare."

—Ben Dovey.

Wanted—Practical Sales Ideas, at $10 Each

THERE ARE only two conditions to meet in submitting ideas for the "Sales Wrinkles" department. First—the contributor must be identified with the gas industry, though not necessarily in a selling capacity. Second—the "wrinkle" must be one which is in practical use by a gas company sales department, a gas appliance dealer, or an individual salesman of gas appliances.

For each idea published in this department WESTERN GAS pays $10.

Contributors this month are:

John H. Hartog, Portland Gas and Coke Company, Portland, Oregon.

Ben Dovey, Southern Counties Gas Company, Pomona, California.

Gladys Walker, Pacific Gas and Electric Company, San Francisco, California.

Read these "wrinkles"—and then put your own on paper and mail it to WESTERN GAS at 124 West Fourth Street, Los Angeles, California.

Kitchen Curtains Sell the Gas Range

WHEN the sales department of a gas company can get its appliances out on the lines and at the same time sell the consumer on the benefits of gas and the local gas service, it has discharged its responsibility in 100 per cent measure.

The Portland Gas and Coke Company merchandising staff is doing just this kind of a job. For instance, here is the way the

sales department has been displanting the "gas is dirty" complex—and at the same time selling gas ranges:

"In order to prove to gas objectors that gas was not dirty, as they claimed it was, but absolutely clean, our salesmen called upon 100 such people and offered them a set of very attractive kitchen curtains, absolutely free.

"Getting the woman interested in these new curtains, the salesman would then stipulate this one condition—that she allow him to install a solid top range, moving her old range to one side and leaving it there for 30 days, at the end of which period it would be taken away from her, the old one put back, all without charge, and he would then get her verdict as to whether she was right, that gas was dirty, or that his contention was correct—that gas was as clean as any fuel and better than any.

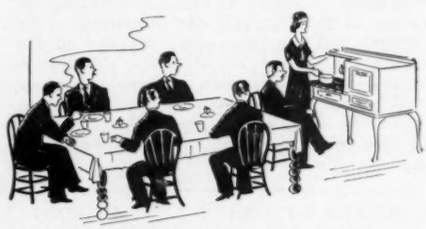
"Out of the 100, 88 accepted; out of these, 42 decided to keep the new range."

—John H. Hartog.

Free Lunch Still Has Appeal

DEMONSTRATION facilities which give the gas appliance salesman an opportunity to show his wares at work in their proper settings are oftentimes the deciding factor in a sale.

The Pacific Gas and Electric Company has a display room of gas and electric domestic ranges. In this room is a complete kitchen with connections for ranges, refrigerator,



dish washing machine, and all other modern kitchen appliances. There is a woman in charge who is an excellent cook and understands the appliances thoroughly in order to explain them to prospects.

Luncheons are held for six people three times a week, for architects, builders, contractors, and apartment house owners. The range they are interested in is connected up and the meal cooked on it. During the course of the meal the conveniences of the range are explained to the prospects, and also how the best results can be obtained through its use.

This kitchen has proven very succsesful and is a big help to the range salesman. Many times the prospect is signed up when the luncheon is over.

—Gladys Walker.

NEW SALES SUPERVISORS NAMED FOR KANSAS CITY GAS CO.

The new business department of the Kansas City Gas Company has recently appointed J. W. Martin, E. E. McGill, R. O. Pitman, and R. P. Lemmon as new sales supervisors. M. B. Buckley is new business manager of the company.

Wyandotte County Gas Co. Salesmen Feted

As A reward for good sales work, Jack Torbert, new business manager of Wyandotte County Gas Company of Kansas City, Kan., recently entertained members of his sales department with an inspection trip to the Ottawa, Kansas, compressor station of the Cities Service Gas Company. A luncheon was served the party at a hotel in Ottawa.

Jack Torbert

Those making the trip from the Kansas City office included Elmer Hay, secretary of the company; Len Stover, superintendent of shop and installation department; R. E. Rulle, chief clerk of the business department; Jack Tobert, new business manager, and the following members of the sales department: F. V. Roberts, L. E. Montgomery, E. P. Mapes, Jack Stewart, F. G. Suchland, John Clements, R. L. McCullick, W. A. Rheinold, John Yost, W. T. O'Neil, Guy Bickett, Harley Burnes, Harold Legge, E. Weising and Bert Miller. J. W. King, manager of the Union Public Service Company at Ottawa, and Roy Phillips, chief clerk, joined the party at Ottawa.

COMMUNITY NATURAL ORGANIZES HOME SERVICE DEPARTMENT

Community Natural Gas Company, affiliated with the Lone Star Gas Company, and serving gas in more than 200 towns in Texas and Oklahoma, has recently organized a home service department to operate under the direction of H. F. Preddy, superintendent of meters for the company. Joe Darrow and J. A. Schnable have been appointed as home service engineers and will give their full time to the work of the Department.

The duties of the home service engineers as outlined by Chester L. May, vice-president of the Community Natural, are:

"To report on the condition of all of the company equipment and appurtenances; to contact the customers and learn whether or not there is any dissatisfaction with the service generally and correct these matters should they exist; to learn whether or not the best of service has been given in all sections of the towns; obtaining a list of the make, and condition of all appliances and to see that they are all in proper adjustment; to advise the customer on the many uses of gas; and to obtain prospects for replacement of obsolete equipment."

TEXAS CITIES GAS CO. REPORTS PROGRESSIVE SALES ACTIVITIES

The Commercial Department of the Texas Cities Gas Company sold a total of 206 ranges during the month of March through special sales conducted by the company. El Paso led the list with a total of 87 ranges. Brenham, Texas, made the record number of sales per meter. W. Friederick of El Paso was the ranking salesman.

In February, 121 water heaters were sold by the Texas Cities, with Waco securing the highest total. Two $10.00 hats were awarded as prizes to B. D. Bruyere of the Waco office and L. A. Lamson of the El Paso office for their work in the water heater sales. C. K. Patton is head of the Commercial Department of the Texas Cities Gas Company.

Additional Returns *in* Western Gas Appliance Merchandising Survey

MUCH interest was generated by the survey of merchandising activities among western gas utilities, published in *Western Gas* for May, 1930. Information from several companies, intended for this survey but reaching the publication offices too late for tabulation, is reproduced in the form below.—*Editor.*

THE ARIZONA POWER COMPANY, PRESCOTT, ARIZONA

Appliance	*Number sold 1929*	*Number sold 1928*	*Quota 1930*
Ranges	13	15	25
Hot plates and laundry stoves	18	28	35
Water heaters	12	10	20
Space heaters	19	36	25
Number of meters, January 1, 1930	1,045		

FORT DODGE GAS & ELECT. COMPANY, FORT DODGE, IOWA

Ranges	117	85	100
Hot plates and laundry stoves	37	80	100
Water heaters	96	137	150
Space heaters	6	4	10
Furnace installations	...	2	5
Furnace conversions	...	...	5
Total merchandise sales in dollars	13,800	16,260	25,000
Number salesmen employed, January 1, 1930	2		
Number meters, January 1, 1930	4,260		

IOWA RAILWAY AND LIGHT CORP., CEDAR RAPIDS, IOWA

Total merchandise sales*	$491,000	362,000	...
Number of domestic salesmen employed, January 1, 1930*	27	...	...
Number of gas meters, January 1, 1930	9,969	...	...

*Includes both gas and electric.

OKLAHOMA UTILITIES COMPANY, BRISTOW, OKLAHOMA*

Ranges	13	...	50
Water heaters	5	...	20
Space heaters	55	...	100
Furnace conversions	81	...	250
Total merchandise sales in dollars	11,272.50	...	27,100
Number of domestic salesmen employed, January 1, 1930*	2		
Number of meters, January 1, 1930	3,400		

*Company started merchandising in November, 1929.

OTTUMWA GAS COMPANY, OTTUMWA, IOWA

Ranges	131	103	130
Hot plates and laundry stoves	58	75	75
Water heaters	48	43	50
Refrigerators	4	1	5
Washers and ironers	117	56	130
Space heaters	16	13	10
Number domestic salesmen employed, January 1, 1930	2		

SAN ANTONIO PUBLIC SERVICE COMPANY, SAN ANTONIO, TEXAS

Ranges	450	481	550
Hot plates and laundry stoves	21	85	50
Water heaters	259	131	350
Refrigerators	...	4	200
Portable incinerators	1	...	10
Washers and ironers	3	...	150
Space heaters	864	634	1,200
Furnace installations	4	...	30
Furnace Conversions	30	5	100
Total merchandise sales in dollars	85,589	62,886	125,000
Number domestic salesmen employed, January 1, 1930	9		
Number meters, January 1, 1930	46,388		

UNION GAS CORPORATION, INDEPENDENCE, KANSAS

Ranges	73	186	...
Hot plates and laundry stoves	6	10	...
Water heaters	4	9	...
Space heaters	182	205	...
Furnace conversions	64	76	...
Total merchandise sales in dollars	20,652	34,414	...
Number of meters, January 1, 1930	14,723		

WINNIPEG ELECTRIC COMPANY, WINNIPEG, MANITOBA, CAN.

Ranges	334	411	425
Hot plates and laundry stoves	47	44	25
Water heaters	22	39	250
Portable incinerators	8	6	15
Clothes dryers	6	5	15
Space heaters	6	4	10
Furnace installations	8	6	15
Total merchandise sales in dollars	25,000	18,000	35,000
Number domestic salesmen, January 1, 1930*	13		
Number of meters, January 1, 1930	18,570		

*Gas and Electric.

The Convention's attractive and efficient hostesses—from New Orleans Public Service, Inc.

New Orleans Plays Perfect Host *to* Natural Gas Men *of* Nation

By CRAIG ESPY

Mid-Continent Manager
WESTERN GAS

PROVIDING a perfect blend of good fellowship and gas craftsmanship, the annual convention of the Natural Gas Department of the American Gas Association meeting in New Orleans, May 5 to 8, stands out as a new high mark in natural gas convention annals.

Total attendance at the meeting was about 1,000, this number falling considerably short of the goal attained last year at Kansas City. It is thought, however, that fully as many gas utility men were in attendance this year, the shortage being attributed to the smaller registration of manufacturers' representatives who usually attend the exhibit booths and help to swell the registration totals.

This large registration speaks exceptionally well for the New Orleans' meeting, due to the fact that there are no large gas companies in close proximity to the city excepting New Orleans Public Service Inc., the company acting as host to visiting delegates.

The arrangement by the New Orleans Public Service Inc., of a wide diversity of recreation, and the spirit with which the various local committees functioned made the social life and entertainment side of the convention a feature long to be remembered.

A. B. Paterson, of the New Orleans Public Service Inc., was chairman of the Arrangements and Entertainment Committee of the convention. J. C. Barnes, appearing on the convention program as chairman of the Publicity Committee, had full charge of the arrangements and entertainment under the supervision of Mr. Paterson. Miss Dorothea Schlesinger and others ably assisted Mr. Barnes in arranging and executing plans.

Committee chairmen of the Ladies' Commitees were Miss Henryetta Bayle, general chairman; Miss Eoline Salassi, chairman of the Registration Committee; Miss Margaret Campbell, chairman of the Committee arranging the boat ride; Miss Elise Waggaman, chairman of the Committee in charge of the dance; Miss Philo Tobin, in charge of the trip to the Vieux Carre; Miss Ethel Ryan, chairman of the Committee for the theatre party; Miss Alice Cooper, chairman of Transportation.

Notable tribute was paid the natural gas industry by H. C. Morris, chairman of the Natural Gas Department, in his address before the first general session on the morning of Tuesday, May 6, when he described the remarkable growth of the industry, which a few years ago was purely local in character, but which is now expanding into an industry national in its scope and its responsibility for service.

Mr. Morris also pointed the way to greater development within the industry through his analysis of off-peak loads. To the end of creating a summer load, he advocates provision of funds for further increasing the activities in house-cooling research and the developing of other devices for off-peak use of gas.

B. J. Mullaney, president of the American Gas Association, in his address described the natural gas industry as America's newest giant, pointing out that the capital investment in the gas industry is approximately $5,150,000,000.

Alexander Forward, managing director of the American Gas Association, explained the work of the Association in his talk "Five Minutes with Headquarters."

In his report as secretary of the Natural Gas Department, E. J. Stephany, brought out the fact that the Department now has 1,360 individual members, and that in probability an educational program will be started for natural gas men.

F. M. Rosenkrans, Gas Service Company, of Kansas City, Mo., in his talk on "Promoting Natural Gas Sales," emphasized the demand for modern selling methods to meet present conditions, and for the building of aggressive selling organizations if load building business is to be obtained.

At the general session on Tuesday afternoon, May 6, J. B. Tonkin, Peoples Natural Gas Company of Pittsburgh, Pa., gave his report on "Natural Gas Fellowships," stating that it has been decided to give the income from a capital fund of about $27,000 to the University of Oklahoma and the University of West Virginia, the money to be spent to maintain graduate scholarships in natural gas subjects.

The funds are made available through the former Natural Gas Supply Men Inc., which was discontinued in 1927. At the time of cessation of activities the supply men turned over to the A. G. A. funds amounting to $17,000, with the stipulation that the income be used for educational purposes.

The former Natural Gas Association turned over to the A. G. A. funds amounting to $10,000, to be used in any way decided upon by the Natural Gas Department. This also has been made available to the educational fund.

The income alloted to each of the two schools will be applied in a manner determined by consultation between the school and a committee of the Natural Gas Department. The schools will submit a list of recommended students each year from which the fellowship students will be chosen.

Funds advanced to undergraduates will

be considered as loans to be repaid by the students after graduation unless the student completes a satisfactory amount of post graduate or fellowship work.

In the absence of W. S. Yard, of the Pacific Gas and Electric Company, San Francisco, who was scheduled to give an address on "Natural Gas Developments on the Pacific Coast," his paper was read by W. G. Vincent, vice-president of the company.

H. S. Bean, United States Bureau of Standards, Washington, D. C., took the place of T. R. Weymouth, Oklahoma Natural Gas Corporation, giving an address on "Gas Measurement."

A report of the Pipe Line Flow Committee, prepared by H. D. Hancock, Henry L. Doherty & Company, New York, was read by T. W. Johnson, Bureau of Mines, of Bartlesville, and a report of the committee on Gas Well Delivery Capacities, which was to have been given by N. C. McGowen, Louisiana Gas and Fuel Company of Shreveport, was read by E. L. Rawlins, of the Bureau of Mines, Bartlesville, Oklahoma.

Dr. J. B. Garner's paper on "Leak Detection and Prevention in Congested Cities" gave in interesting detail a review of the program being followed for systematic inspection of the streets and highways in Pittsburgh, Pa., where he is associated with the Peoples Natural Gas Company.

"Pipe Protection" was discussed by Geo. W. Wehrle, Public Service Company of Denver, Colorado, at the Wednesday morning general session. At this same session, W. J. McIntyre, Southern Cities Distributing Company, Shreveport, talked on "Building the Domestic Load by Selling Appliances."

Miss A. Berry, San Antonio Public Service Company, of San Antonio, Texas, gave an interesting talk on "Home Service," followed by R. E. Haas, Columbia Gas and Electric Corporation, New York, who spoke on the "Activities of a Public Relations and Advertising Department."

OPEN FORUM

Wednesday afternoon was given over to an open forum, presided over by J. D. Creveling, and featuring discussions on "Handling Water in Wells," led by J. H. Dunn, Lone Star Gas Company, Dallas, Texas; "Recent Progress in the Saturation of Natural Gas with Oil and/or water," led by H. L. Gaidry, New Orleans Public Service Inc., New Orleans, La.; "The Relative Advantages of Displacement and Orifice Meters," led by George B. Sheppard, United Gas Company, Houston, Texas; "How to Build up Load in Southern Climates with a Large Percentage of Colored or Foreign Population," led by L. E. Vogelsang, San Antonio Public Service Company; and "Selling Gas for Househeating with Straight Natural Gas and Conversion Units" discussion leader J. J. Brennan Memphis Power and Light Company, Memphis, Tennessee.

Thursday morning, at the final business session of the Convention, a report of the committee on Uniform Classification of Accounts, was given by E. N. Watkins, Arkansas Natural Gas Corporation, followed by a paper on the "Application of Degree Day Deficiency to Computing Domestic and Heating Loads," by R. M. Redding, Dallas Gas Company, Dallas, Texas. Other subjects covered at this final session were "Gas Field Studies,' by E. L. Rawlins, U. S. Bureau of Mines, Bartlesville, Oklahoma; and "Development of Larger Industrial Sales," by W. M. Little, Cities Service Gas Company, Bartlesville, Oklahoma.

Committee meetings as usual took an important place on the program.

At a meeting of the Managing Committee it was decided to hold a Natural Gas Sales Conference in the Southwest in the Fall of 1930.

It was also decided by the Managing Committee to hold the Southwest Divisional meeting in connection with the Annual Natural Gas Convention. Prior to this year the divisional meeting was held annually at some point in the Southwest.

The report of the Committee on the Chairman's address, which was adopted by the convention, approved Chairman Morris' recommendation that greater research work be extended into the development of house cooling and other plans which improve the load factor. The Chairman's recommendation was also approved for the appointment of a committee to make a study on the subject of natural gas company membership dues.

A report from the gas measurement committee stated that after a period of between five and six years' research on orifice meters, a report was to be released very soon, giving for the first time complete information on selection factors for orifice meters. showing how to pick the meter for the job; how to install the meter; how to operate it; and the proper coefficients to use. This report is also to carry a very definite statement regarding the correctness of coefficients.

NATURAL GAS CONSERVATION

A resolution proposed by the Committee on Natural Gas Conservation and unanimously adopted by the convention, recommended that the problem of more rigid and efficient conservation of natural gas resources be made the subject of intensive study, and that a survey be made on this subject by the main technical and research committee, with the cooperation of other agencies, in time for a report to be made on the subject at the meeting of the Natural Gas Department at the A. G. A. Convention in October.

The nominating committee will also make its report at the official meeting of the A. G. A. to be held in October. Following the past policy of advancing the vice-chairman to the chairmanship of the department, H. C. Cooper is due to fill the office that will be vacated in October by H. C. Morris, this year's chairman.

Whether the policy of "no exhibits" will prevail at the next annual meeting is a question yet to be decided by the managing committee of the Natural Gas Department. It is likely that the decision in this regard may be announced at the A. G. A. Convention at Atlantic City in October, or shortly thereafter. In the meantime personal expressions from manufacturers on this subject are to be sought, thereby ascertaining the desires of those most vitally interested.

The time and place committee for the 1931 convention will probably report at the A. G. A. meeting in October. Although invitations have been sent the convention from various Chambers of Commerce, Department executives wish it to be known that the place of the convention is entirely open and that invitations are solicited from both cities and gas companies.

As established last year at the A. G. A. annual convention, the convention city chosen by the Natural Gas Department must be west of the Mississippi or on the Mississippi.

ENTERTAINMENT FEATURES

The social calendar of the convention was crowded with events planned for the enjoyment of the delegates. A boat ride on the Mississippi, the first afternoon, set free a spirit of good will and fellowship which prevailed throughout all the sessions.

The Grand Ball Monday night, taking the customary place on the program of the annual banquet, was a most enjoyable "follow-up" to the afternoon's events.

Remarked on every hand was the attractiveness and charm of the feminine personnel of the New Orleans Public Service Inc.; and to this group of young ladies much is due for the spirit of graciousness which was apparent in all entertainment features.

The evening theatre party for the visiting wives of convention delegates was another notable event. It is the usual custom of the Department to provide funds for a theatre party each year for the ladies. This year New Orleans Public Service Inc., added to this available fund, making it possible to secure the "Le Petit Theatre du Vieux Carre," and the Little Theatre entertainers in their feature production, "A Night in Old New Orleans." About 350 ladies attended this show, and were later served with refreshments in the patio of the theatre. Negro spiritual singers entertained during the serving of the mid-night luncheon.

On the same night the stag was held for the men, and this was another memorable success for the convention.

Topping off these entertainment features were the many private parties which had a large place in the good fellowship program. There were also several specially conducted tours for the benefit of convention ladies.

OKLAHOMA CONTRACTING CO. MAKES PERSONNEL CHANGES

Oklahoma Contracting Company, which has been identified with pipe line activities throughout the Mid-Continent and Southern fields for the past 12 years, has been reorganized and expanded, according to Tom Jones, president of the company. On May 1, Mr. Jones announced four new associates, all of whom have been actively identified with the oil and gas industries for the past 20 years. They are Ray Johns, C. A. Mulligan, Bill Hanrahan, and Mike Deluca.

Ray Johns has been with the Oklahoma Contracting Company for the past four years, in the capacity of consulting engineer and general superintendent. C. A. Mulligan comes to this company from the Humble Pipe Line Company, where he was assistant general superintendent in charge of construction and pumping stations. With Mr. Johns, he will have supervision of construction work in the field.

Bill Hanrahan has been in the pipe line and oil business for 24 years, serving in various capacities in the field. Mr. Hanrahan will be in charge of the office in Dallas.

Mike Deluca, who has had 20 years experience in the field, will continue in charge of construction work.

The Oklahoma Contracting Company was organized in 1918, and incorporated in 1923. During the 12 years it has been in existence, this firm has constructed more than 5,000 miles of pipe lines for many of the major oil and gas companies throughout the South and Middle West. Offices are in Dallas and Tulsa.

DANNER OF TEXAS CITIES GOES WITH P. W. CHAPMAN & CO., N. Y.

H. E. Danner, vice-president and general manager of the Texas Cities Gas Company, has resigned his position to become associated with P. W. Chapman & Company interests in New York.

The Application *of* Degree Day Deficiency

the area served. Hence the desirability of measuring possible sales by a per capita yard stick.

The per capita value of this unit is the present day total demand and is not influenced by price variation so long as the price charged is within the economic limitations of competition. In support of this statement attention is called again to Exhibit III, and to Exhibit IV. It will be noted that the per capita use has increased during the past 10 years in the face of substantial increases in dollar cost and in gold dollar purchase value rate. This relation between use and cost both actual and relative is shown graphically in Exhibit IV.

(Continued from Page 26)

It will be observed that Dallas seems to be stabilized on a value of about 14,800 cubic feet per capita per year for domestic rate use, this being the average of the last five years reported. The variable is space heat requirement and has a range of 1800 cubic feet between minimum and maximum years.

As will be inferred, I have been leading up to the establishment of a measure of pure domestic requirement on a per capita basis. To secure the necessary unit to permit the expressing of this value as an equation, the Domestic Rate Sale over a five-year period is again handled somewhat differently in order to reach the heat requirement on a per capita basis. This analysis of sales will be found in Exhibit V and for purely domestic use develops a value of 3.3 cubic feet per Degree Day per capita for space heat only.

With this value we may now set up an equation to be used in calculating possible Domestic Sales (exclusive of commercial paying domestic rate) on a per capita basis and for a given area:

Population [6780 + (D. D. D.*) 3.3] = Annual domestic requirement in cubic feet of 1000 B.t.u. gas.

*Degree Day Deficiency

As a companion of this equation it will be desirable, if possible, to establish a means of calculating the saturated maximum day demand for domestic use only, and under conditions of continuous heating during low temperatures. To do this we will need a per capita per day value for cooking and hot water. Heretofore 23,320 cubic feet has been used as the requirement per meter for the seven months, November to May inclusive; also a population-to-meter ratio of 5.2. Therefore:

$$\frac{23{,}320}{212 \times 5.2} =$$

per capita per day during winter months = 21 cubic feet for cooking and hot water.

Available also are detailed records of four days of maximum demand during the past three years. These data are given in Exhibit VI. Analysis of these maximum day sales gives a value of 3 cubic feet per Degree Day per capita for space heat only under conditions of continuous heating, and where gas used for cooking also materially assists in supplying required heat. For domestic sales only, and not including such gas as may be used for commercial and industrial purposes but paying the domestic rate, we may write the equation:

Maximum day domestic demand = Population [21 + (D. D. D.) 3]

SUPPLEMENT

Supplementing the foregoing analysis of Domestic Rate Sales and illustrating some

EXHIBIT VI-C. TYPICAL MAXIMUM DAY-DOMESTIC RATE SALE ONLY 24 HOURS ENDING 12 MIDNIGHT, JANUARY 18, 1930.

Hour Ending	Temperature °F.	Sales M. Cu. Ft.	Sales Per Meter Cu. Ft.	Sales Per Capita Cu. Ft.
1.00 A. M.	—1	1,065	16.2	3.4
2.00 A. M.	—1	1,049	16.0	3.3
3.00 A. M.	—2	1,051	16.0	3.3
4.00 A. M.	—2	1,075	16.4	3.4
5.00 A. M.	—2	1,391	21.2	4.4
6.00 A. M.	—3	2,019	30.8	6.4
TOTAL Avg.	—1.8	7,650	116.6	24.2
7.00 A. M.	—3	2,849	43.4	9.0
8.00 A. M.	—2	3,816	58.1	12.1
9.00 A. M.	—1	4,176	63.6	13.3
10.00 A. M.	0	4,244	64.7	13.5
11.00 A. M.	1	4,119	62.8	13.1
12 Noon	3	4,049	61.7	12.9
TOTAL Avg.	—0.3	23,253	354.3	73.9
1.00 P. M.	16	3,823	58.3	12.1
2.00 P. M.	20	3,554	54.2	11.3
3.00 P. M.	26	3,148	48.0	10.0
4.00 P. M.	23	2,956	45.0	9.4
5.00 P. M.	23	2,942	44.8	9.3
6.00 P. M.	23	3,118	47.5	9.9
TOTAL Avg.	21.9	19,541	297.8	62.0
7.00 P. M.	22	3,400	51.8	10.8
8.00 P. M.	20	3,094	47.1	9.8
9.00 P. M.	20	2,762	42.1	8.8
10.00 P. M.	19	2,204	33.6	7.0
11.00 P. M.	18	1,781	27.1	5.7
12 Midnight	17	1,291	19.7	4.1
TOTAL Avg.	19.3	14,532	221.4	46.2
TOTAL—24 Hours Avg.	9.7	64,976	990.1	206.3
Population territory served		315,000		
Live Meters		65,650		
Live Meter Ratio		4.8		

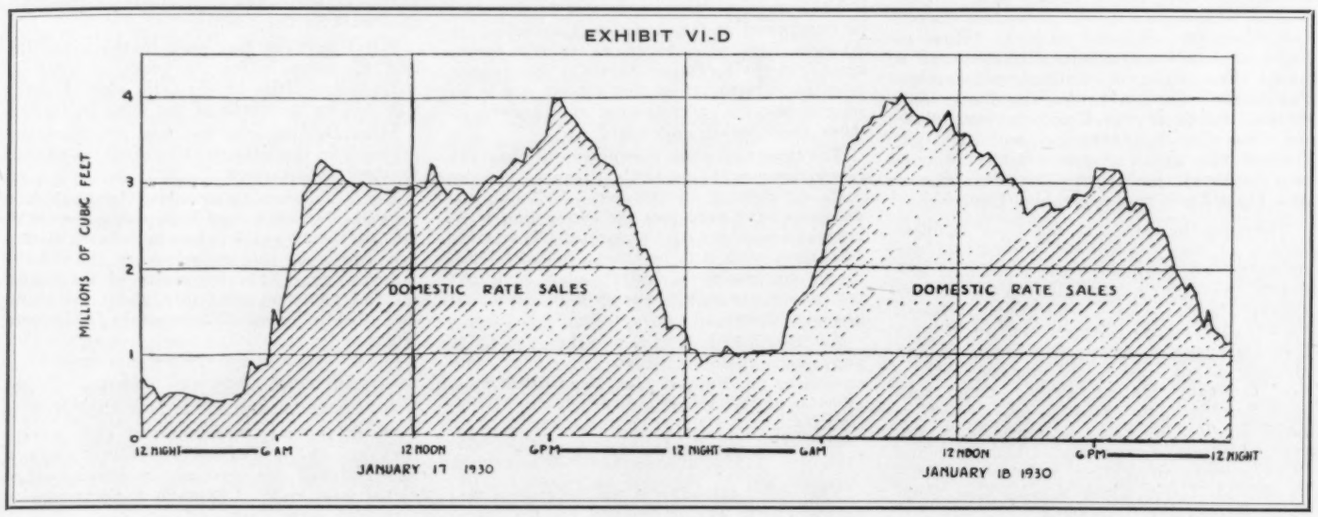


EXHIBIT VII. DAILY TEMPERATURES—U. S. WEATHER BUREAU

Day of Mo.	December						January						February					
	Max.	Min.	Mean	D.D.D.	*D. D. D. 30 Day Expired Period		Max.	Min.	Mean	D.D.D.	*D. D. D. 30 Day Expired Period		Max.	Min.	Mean	D.D.D.	*D. D. D. 30 Day Expired Period	
					1929	1928					1930	1929					1930	1929
1	43	37	40	25	529	351	67	48	58	7	484	577	50	44	47	18	981	624
2	37	25	31	34	550	334	59	38	48	17	467	601	59	46	53	12	976	625
3	54	23	38	27	572	338	51	33	42	23	463	591	60	54	57	8	961	637
4	64	34	49	16	571	333	50	33	42	23	470	590	55	42	48	17	955	650
5	65	39	52	13	571	348	60	35	48	17	474	592	63	35	49	16	954	650
6	71	45	58	7	567	367	64	50	57	8	475	598	71	45	58	7	953	649
7	59	42	50	15	575	388	60	28	44	21	481	600	72	47	59	6	938	659
8	70	36	53	12	579	406	29	22	26	39	508	592	72	47	59	6	905	685
9	75	54	64	1	569	422	27	18	22	43	550	576	74	52	63	2	864	723
10	77	57	67	..	564	433	22	14	18	47	597	576	56	41	48	17	834	739
11	74	63	68	..	564	449	33	22	28	37	634	579	61	41	51	14	811	748
12	72	64	68	..	554	461	41	33	37	28	662	582	75	59	67	..	783	757
13	70	64	67	..	530	467	50	38	44	21	683	586	67	46	56	9	771	771
14	68	61	64	1	504	478	40	26	33	32	714	583	56	42	49	16	755	790
15	68	60	64	1	483	487	30	16	23	42	755	593	52	39	45	20	733	797
16	64	58	61	4	466	499	28	11	20	45	796	606	57	34	45	20	708	795
17	68	35	52	13	460	509	23	−1	11	54	837	592	68	40	54	11	665	796
18	35	22	28	37	482	519	26	−3	12	53	853	573	75	44	59	6	618	809
19	27	14	20	45	507	525	30	14	22	43	851	555	69	48	58	7	582	837
20	33	24	28	37	519	532	32	29	30	35	849	544	69	49	59	6	553	857
21	33	28	30	35	525	543	31	9	20	45	859	543	71	59	65	..	508	871
22	40	19	30	35	526	553	24	4	14	51	875	525	63	58	60	5	462	890
23	40	24	32	33	529	557	44	18	31	34	876	529	76	62	69	..	428	888
24	50	24	37	28	530	572	47	27	37	28	876	537	79	67	73	..	400	873
25	65	39	52	13	518	569	48	30	39	26	889	560	70	53	62	3	377	846
26	66	40	53	12	513	555	50	41	46	19	896	581	62	46	54	11	369	832
27	58	43	50	15	516	541	47	34	40	25	906	593	55	45	50	15	359	831
28	63	36	50	15	526	530	35	30	32	33	924	610	59	44	52	13	339	825
29	62	34	48	17	518	536	44	30	37	28	935	620						
30	69	41	55	10	501	536	52	31	42	23	948	614						
31	74	53	64	1	502	559	55	28	42	23	970	620						
Avg.	58.5	39.9	49.2	502			41.9	25.4	33.6	970			65.5	47.3	56.4	265		

*Degree Day Deficiency

of the load characteristics of Domestic Rate service in climatic conditions comparable with North Texas, Exhibits VI-a, VI-b, VI-c and VI-d are included. VI-a-b-c are hourly records of temperature and Domestic Rate Sales in bulk and on a per capita basis.

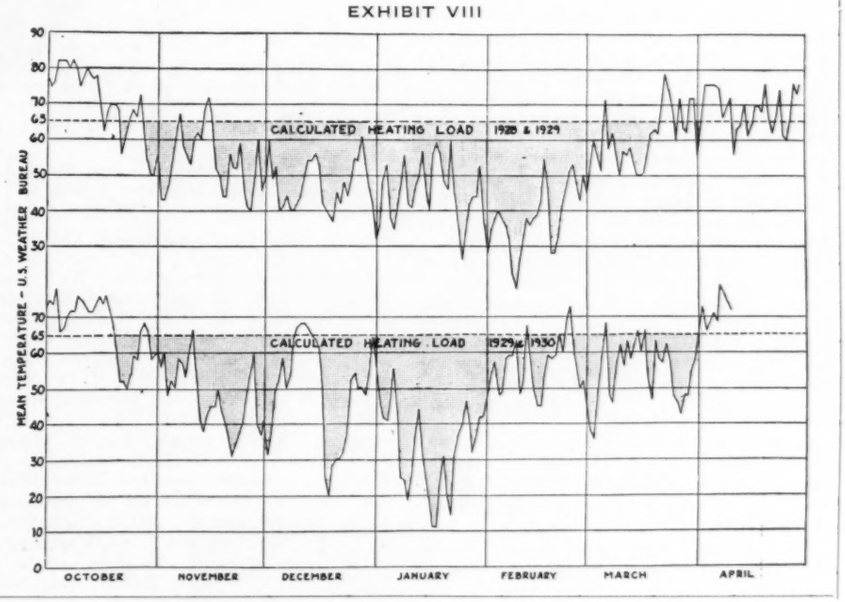
Exhibit VI-d is a curve of the deliveries for Domestic Rate purposes during the 48-hour period ending Midnight January 18, 1930, and is a plotting of the sales shown in Exhibits VI-b-c.

Attention is called to the uniformity of the load during periods of low temperature. The load factor for this particular 48-hour period is about 80 per cent.

Exhibit VI-a represents maximum day Domestic Rate Sales in 1928-29 heating season. The total of Domestic Rate Sales for this heating season was 4,362,743 M.cu.ft., equivalent to a seasonal load factor of 40 per cent; and an annual factor of 28 per cent based on 5,240,633 M.cu.ft. Domestic Rate Sales for 12 months ending May 31, 1929.

Exhibits VII and VIII illustrate some of the commercial applications of the use of D. D. D. calculations in the handling of customer's complaints of high bills.

EXHIBIT VIII



NEW COMPANY ORGANIZED TO SERVE LEWISTOWN, MONT.

Organization of the Central Montana Utilities Company, to serve natural gas in Lewistown, Montana, has been announced by R. M. Heskett, vice-president of Minnesota Northern Power Company. Frank P. Book is president of the new company, and will supervise the development and operation of the new property.

The directors of the Central Montana Utilities Company are Frank P. Book of Detroit, Michigan; C. W. Buntin of Lewistown, Montana; C. C. Yawkey, Ben Alexander and A. P. Woodson of Wasau, Wisconsin; and R. M. Heskett of Minneapolis, Minnesota. The four gentlemen last named are officers of the Minnesota Northern Power Co. E. J. Hubbart of Great Falls will act as consulting engineer on the construction of the new property.

AMERICAN NATURAL GAS CORP. TO LAY 72-MILE LINE

The American Natural Gas Corporation is preparing to lay a natural gas transmission line from the Quinton gas field in Pittsburg County, Oklahoma, to the Bald Hill Station in Okmulgee County. There will be 62½ miles of 16-inch pipe and 10 miles of 8-inch, and the Ozark Pipe Line Company will operate the line.

PERSONNEL CHANGES ANNOUNCED BY UNITED SUBSIDIARIES

Eli R. Cunningham has been appointed operating manager of the Houston Gulf Gas Company. Ray Rountree has been given complete charge of the measurements departments of the Houston Gulf and the Dixie Gulf Gas Companies.

GARDINER IS ADVERTISING MANAGER FOR BYLLESBY

John J. O'Brien, president of H. M. Byllesby and Company announces that J. F. Gardiner has been appointed advertising and publicity manager of H. M. Byllesby and Company.

Gas Exhibits Feature Food Show

By D. L. LEAHY
Southern Counties Gas Company

THE Natural Gas Bureau of Southern California, which includes the Los Angeles Gas and Electric Corporation, the Southern California Gas Company, and the Southern Counties Gas Company, through its joint Exhibits Committee participated in the Sixth Annual Food and Household Show held in the Auditorium of the Los Angeles Ambassador Hotel from May 11 to May 17, telling the story of natural gas and modern natural gas burning appliances to some 150,000 people. This show is an annual event and is well directed by experienced show men for its sponsors, the Southern California Grocers Association.

The gas exhibit, designed by one of the committee, Frank L. Moon, covered a floor space of 1,300 square feet, in which a modernistic motif was ably portrayed. J. E. Kern, another member of the committee, fitted into this display equipment that carried out the story of modern cookery. All appliances were connected and in operation, including a number of gas refrigerators, ranges, and water heaters. A third member of the committee, D. L. Leahy, was in charge of the personnel for the week. In all, 90 salesmen volunteered their services. It required 15 men to man the stations each day from 2 o'clock to 10 o'clock P.M.

In addition to these salesmen, two home service directors gave cooking demonstrations daily. It was the good fortune of the committee to have Mrs. Kate Brew Vaughn, widely known Home Economics expert, in the booth on Tuesday afternoon. Mrs. Vaughn was enthusiastically received by the patrons of the show. She answered hundreds of questions pertaining to cooking, and samples of her prepared delicacies were enjoyed.

Another feature of the Food Show was the Glass House, a modern five-room bungalow, occupied for the week by Miss Edna Kirby, "the Paramount Girl," who, through a system of microphones and loud speakers, was able to tell her audience of the modern methods employed in the home today. The gas range and the gas refrigerator in her kitchen were given wide publicity. It was the privilege of James Merigold, salesman for the Southern Counties Gas Company, to take dinner with Miss Kirby, and, as all of their conversation was carried out over the microphone, Mr. Merigold seized the opportunity for a two-hour discussion on the benefit of gas in the home.

In connection with Santa Monica day at the Food Show, held May 14, the Natural Gas Bureau and the Southern Counties Gas Company were asked to stage a special program in the Ambassador Auditorium. A "History of Cooking in the United States" was presented in a series of six tableaux depicting cooking in the day of (1) the American Indian and his open fire; (2) the early Colonial open fireplace and crane; (3) Southern plantation wood stove; (4) the '49ers campfire on the overland crossing; (5) early Californian adobe oven; (6) the modern kitchen. This last tableaux action in pantomime showed a young woman returning to her kitchen at 6:05 p.m. from an afternoon out. She stepped to the gas range for her meat and vegetables, to her gas refrigerator for salad and dessert—and walked off-stage carrying a tray laden with a complete meal. The script for the tableaux was written by Walter Thurber of the Southern Counties Gas Company, and was enacted by dramatic students from the Santa Monica high school. The director of dramatics from the high school read the "History of Cooking" as the action took place, and each scene was supported by music furnished by the Santa Monica band.

Five hundred Santa Monica women and 1,000 women from Los Angeles and vicinity filled the Ambassador Auditorium to capacity. More than a dozen presidents of women's organizations from Santa Monica were in attendance.

Katheryn Rathbone, home service director for the Southern Counties Gas Company in the Santa Monica district, was the hostess in charge. The "Santa Monica Outlook" cooperated with the gas company in the staging of the afternoon's program. One feature was a motorcade from the Santa Monica Chamber of Commerce, headed by the city's mayor.

PIPE LINE SUPERINTENDENTS MEET IN ANNUAL SESSION

Thirty-two district and divisional pipe line superintendents of the Cities Service Gas Company recently met in session in Bartlesville, Oklahoma, in the third annual meeting of their organization.

V. C. Jarboe, superintendent of gas transportation; D. J. Wallace, safety director of the Mid-Continent Oil & Gas Association; George Roth, chief clerk of transportation; E. C. Chaney, B. C. Butts and George Yoe, from the Bartlesville office addressed the group.

Among those attending were the following pipeline superintendents:

J. J. Corrigan, Miami; Henry Peak, Kansas City; Harry McDaniel, Tallant; H. Ray Taylor, Okemah; Ira Camp, Mooreland; Roy Corn, Independence; W. P. Benedict, Winfield; Walter Reagan, Blackwell; Bert Harris, Joplin; Roy Gearhart, Lawrence; S. W. Hunsaker, Oklahoma City; H. N. Peters, Wichita; J. L. Cummings, Pampa; Burr Wiand, Emporia; P. J. Emington, Caney; N. B. Thompson, Grenola; Charles Short, Drumright; Pete Cheeseman, Chanute. L. D. Williams, Wichita; C. A. Gibson, Ottawa, and Hugh E. Smith, Bartlesville, district superintendents, also attended the meeting. Members of the Bartlesville office who attended the sessions included: V. C. Jarboe F. D. Renfro, B. C. Butts, George Roth, Jess Evans, E. M. Rowland, E. C. Chaney, T. T. Wicks, George Yoe, N. D. Holman and R. J. Daugherty.

ADDITIONAL LINE BEING LAID ON PALESTINE MAIN

About 4,000 feet of additional high pressure line is now being laid at Palestine, Texas, tieing in to the high pressure line of the Dixie Gulf Gas Company now supplying gas to the city.

COAST COUNTIES G. AND E. TO SELL AVENAL PROPERTY

Coast Counties Gas and Electric Company of Santa Cruz, California, has applied to the California Railroad Commission for permission to sell its gas properties in Avenal, Kings County, to the West Side Natural Gas Company.

DALLAS GAS CO. RELEASES FIFTH MOVIE ON GAS USES

The "Blue Blaze," employee publication of Lone Star Gas Company and affiliated interests published the following interesting account of the making of moving pictures that advertise Dallas gas. These pictures make a circuit of 16 theatres in Dallas.

"The Dallas Gas Company has made another moving picture, its fifth release. There is a cast of four and the setting is around the fireplace—'the social center of the home.' The plot revolves about the social activities of the sub-deb set.

"These little advertising films are run at the neighborhood picture houses. The gas company advertising department has had stirring experiences, planning the scenarios, signing up players, finding locations, and directing the action. One time the department was literally up in the air. The scene opened at Love Field, in a sport model airplane that took off and flew over town. Then the camera man and the director had to race back down and climb aboard freight cars near the terminal, to take the airplane circling over the skyline.

"On one of the rainiest days in the history of Dallas, we worked for two hours to get the action for a gas refrigerator film, wherein some little children helped themselves to a plate of lucious fried chicken. By the time the last flash flickered, the picture crew was so hungry they slithered down the flooded street to a delicatessen for chicken sandwiches.

"For the laundry film, we had to imitate rain, spattering a garden hose above a window, to make the shower come storming across the window pane. Inside the house, of course, the week's washing was drying merrily in the gas-fired dryer."

TEXAS GAS UTILITIES LINE TO BE COMPLETED JULY 1

July 1 is the announced completion date for the Texas Gas Utilities line which will extend from the Chittim wells in Maverick County, Texas, to the Central Power & Light Company's new plant on Devil's River, 12 miles northwest of Del Rio. The line to this point will be 62½ miles in length.

The entire fuel requirement of the power company will be supplied from the line, which will also be extended to serve domestic and industrial consumers at Del Rio and other communities in Valverde, Kinney and Maverick counties.

Recently when Chittim well Number 3 of the company was cleaned and shut in, the pressure of the well was brought up to 2,110 pounds per square inch, indicating that the company has larger reserves than was formerly anticipated.

The Texas Gas Utilities Company operates as a subsidiary of the Appalachian Gas Corporation.

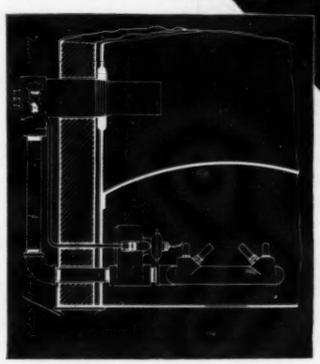
LONE STAR GAS CO. CHART SHOWS FLUCTUATIONS IN GAS USE

In order to show the wide seasonal fluctuations in the natural gas demand over the Lone Star Gas Company system, the company has prepared a large graphic chart showing that for almost eight months in 1929 the demand was below the daily average and that the output ranged from as high as 260,000,000 cubic feet a day in December down to 50,000,000 cubic feet daily in June.

Use is made of the chart in talks before luncheon clubs and similar organizations in showing the public the severe test put upon a natural gas company in the Southwest to maintain service in sharply changing weather conditions.

KLIXON SAFETY PILOT

B-1226
for
Barber Burners



FOR AUTOMATIC {GAS} STORAGE WATER HEATERS

SIMPLICITY is the key point in the Klixon Safety Pilot, because it has the exclusive use of the Spencer snap-acting thermostatic disc. This bi-metallic disc snaps from concave to convex (and vice versa) at a predetermined point in the temperature range, opening and closing an attached valve with a direct and powerful action. In the case of the Klixon Safety Pilot it shuts off the main gas supply if the pilot goes out for any reason. This pilot has been approved and tested under all conditions of household use. Leading gas companies find it a profitable specialty to push,—no service is needed. If you haven't seen this safety pilot in operation, you can have no idea what SIMPLICITY really means. Can we arrange a demonstration, send folder, or what?

SPENCER THERMOSTAT CO

CAMBRIDGE · · · MASS

Pacific Coast Representative, B. W. MUELLER, 447 Sutter St., San Francisco, California

16 gas refrigerators for first apartment installation on Southern Counties lines. They went into the apartment house shown in the background.

Gas-Fired Refrigeration *for* Apartment House

THE first apartment house installation of gas-fired refrigerators on the Southern Counties Gas Company system was completed in May, when 16 Electrolux refrigerators, Model EL-3A, were placed in the Clay Apartments, San Pedro, Calif.

This apartment house was under contract for modernization, with mechanical refrigeration as a part of the specifications, and the San Pedro office of Southern Counties was successful in closing the deal. The appliance chosen was the new smaller apartment house model.

O. R. C. Grow is in charge of the San Pedro district office for Southern Counties Gas Company.

Gas *versus* Oil *as a* Fuel *for* Steam Boilers

(Continued from Page 30)

to be practically the same for both boilers and averaged about 2 per cent, so this figure was used for the test.

An attempt was made to keep the rates at which the two boilers operated approximately the same and the figures show that this was accomplished. The gas boiler averaged 4 per cent higher rating than the oil boiler, but this would have little effect either way on efficiencies.

The fact that the measurement of feed water by orifice meters is subject to some error is fully appreciated, but since the object of the test was to obtain relative results rather than absolute, it is believed that any errors in metering would be the same for both boilers, as the meter installations were identical.

The efficiencies shown are on the basis of steam generated and not on steam available for power or process work. With the gas fired boiler all the steam generated is available for useful work, but with oil it is necessary to pump, heat and atomize it before it can be burned. This reduces the amount of steam available for useful work from 3 to 10 per cent. For this particular boiler 4 per cent was considered a reasonable figure. Another steam loss which is incurred with the oil fired boiler and which is not included in the figures is the steam used for blowing soot. Soot was blown on these boilers once every 24 hours. With the gas no soot was formed, thus saving this steam for useful work.

According to the operators, it was unnecessary to give the gas fires any attention after lighting the burners.

Mention has been made of the fact that the water fed to the boilers during the blow-down period and the fuel used during this same period are not included in this test. It is apparent that a variation in the blow-down of the boilers would cause some change in the efficiencies as given if all the water fed to the boilers and all the fuel used by the boilers were considered in determining the efficiency of the boiler. As evidence of this it is interesting to note that over 400,000 pounds of water was fed to boiler No. 1, while only 200,000 pounds was fed to boiler No. 2 during the blow-down periods. Assuming that a portion of this water was evaporated in the two boilers at the efficiencies shown during the balance of the test, the blow-down on the oil boiler would have been excessive. Thus the human element enters into an operation such as this, and in order to obtain a true comparison the whole operation must be separated from the balance of the test.

CONCLUSIONS

This test, in which gas was burned in competition with oil in a plant that is, without doubt, one of the most efficiently operated boiler plants in the San Francisco Bay district, proves decisively that in actual operation gas can be burned more efficiently than oil. Considering only the 1.9 per cent higher efficiency and the 4 per cent utilization steam saved, the same work can be done with 8 per cent less heat delivered to the boiler if gas is used. However, let me again stress the point that these results cannot be expected if the burner equipment and method of installation are not of the best. In interpreting these results in terms of smaller plants it may be safely assumed that the advantage of gas would be even greater, especially in plants with a widely fluctuating load and not equipped with an elaborate damper control system. It is to be expected in smaller plants that the average overall efficiency of both oil and gas will be lower; however, the difference between the two will, on the whole, be more decidedly in favor of gas.

ENGINEERS OF L. A. AREA MEET IN CORROSION DISCUSSION

A MEETING of 130 engineers from the gas and oil industries, on the subject of corrosion, was held on April 30 in the auditorium of the Los Angeles Gas and Electric Corporation, with K. I. Logan of the Bureau of Standards. The meeting was called by W. M. Henderson, superintendent of gas distribution for the Los Angeles Gas and Electric Corporation and representative for the Pacific Coast Gas Association on the American Gas Association pipe protection committee.

Mr. Logan was on the west coast to inspect pipe specimens buried throughout California. The specimens were buried several years ago as a part of the Bureau of Standards corrosion research. While on the coast Mr. Logan buried additional pipe specimens in new locations selected by Guy Corfield, chemist of the Los Angeles Gas and Electric Corporation.

In his discussion before the Los Angeles group Mr. Logan summarized the work conducted by the Bureau of Standards on soil surveys to determine the effect of various soils on pipe. The Bureau's work extends over seven or eight years. He discussed several new problems such as that of galvanic action involved in self-induced line currents. J. F. Putnam, research chemist of the Standard Oil Company at Richmond, Calif., led a discussion on a method which he has developed for correlating soils to determine their relative corrosiveness. Mr. Putnam accompanied Mr. Logan in his trip throughout California.

LONGVIEW, WASH., GAS PLANT TO BE FINISHED SEPT. 1

Work on the construction of a plant and distribution system for the service of manufactured gas in Longview and Kelso, Washington, is progressing, and will be completed about September 1. Western Gas and Utilities Corporation has been formed by the parent organization, the Public Utility Investment Company, to own and operate the property. R. A. Hopkins is in charge of the construction work. He was formerly with the gas department at company headquarters, Salina, Kansas. C. R. Burson, formerly of the Minot Gas Company, Minot, North Dakota, has been named new business manager for the company at Longview.

Cost of the new plant and 15 miles of distribution main is estimated at $250,000, and it is expected that additional transmission mains will be laid to towns within a radius of 30 miles of Longview.

COMMUNITY NATURAL GAS CO. ORGANIZES BASEBALL TEAM

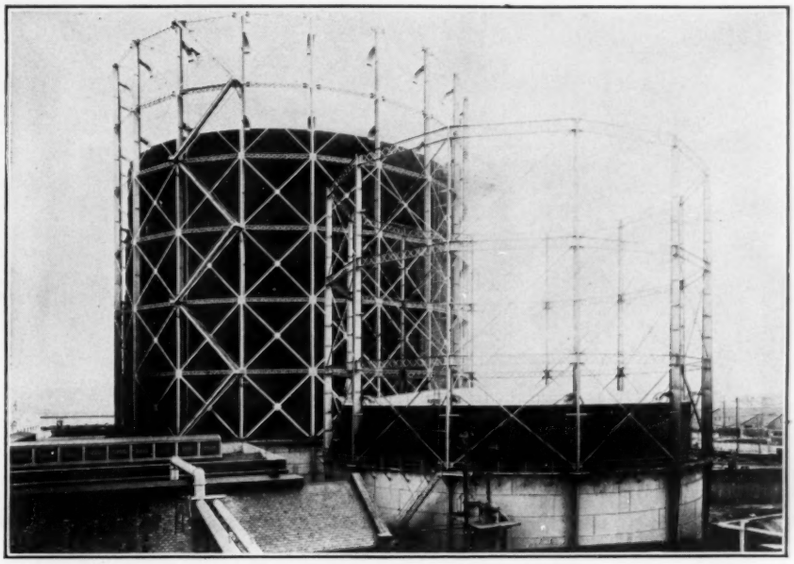
The Community Natural Gas Company at Temple, Texas, has recently organized a baseball team, sponsored by the Temple Telegram, city newspaper. The team will compete for baseball honors in central Texas. Suits worn by the players bear the name of the Community Natural on the front and the name Stargas on the rear.

Building Industrial Load

with

N. G. E.

GAS BURNERS



Gas holders at the P. G. & E. Potrero plant, San Francisco, which maintain supply and pressure for Bay District industries

ALERT Pacific Coast plants are rapidly being changed to "smokeless industries"... gaining at the same time higher operating efficiency in boilers, furnaces, kilns, ovens, and other types of heat-utilizing equipment... by using *natural gas*, the most perfect fuel known...

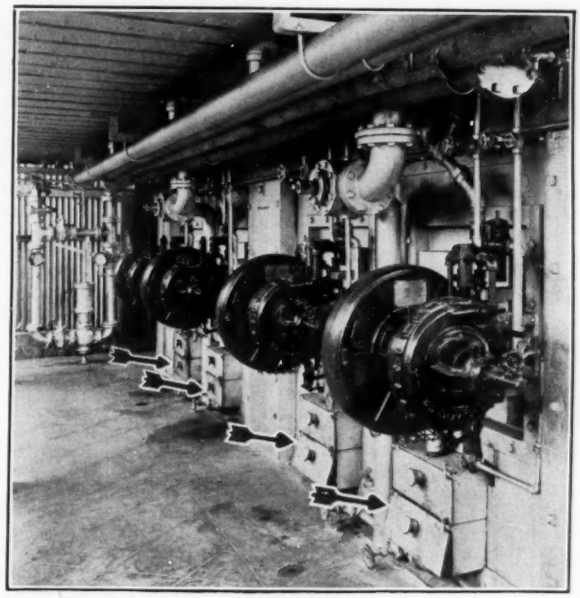
The Pacific Gas and Electric Company...itself one of the largest users of natural gas...places its experienced engineering staff at the call of industries seeking better plant performance, as well as supplying ample quantities of this most modern fuel to Pacific Coast industries through the new $11,000,000 Kettleman Hills pipe line.

P. G. & E. engineers have selected N. G. E. Gas Burners *Type A* for the Company's plants at San Francisco, Oakland, San Jose, Stockton, Sacramento, and Fresno...

N. G. E. Burners "Engineered to the Job"

Problems met and advantages gained by the use of *natural gas* burned in N. G. E. burners...product of the West's pioneer gas combustion engineers...are as numerous and varied as Western industries. Therefore, no cut-and-dried recommendations covering all cases...

First...facts about each plant...then the correct selection from many types of N. G. E. burners for improved economy and the highest efficiency...



Eight N. G. E. Gas Burners Type A in the 450 h.p. Stirling boilers in the San Jose P. G. & E. plant. Note compactness and simplicity as compared with oil burners installed for stand-by. Wilgus Gas Fuel Regulator against far wall maintains steam pressure constant by automatic control of gas supply to burners.

NATURAL GAS EQUIPMENT, INC.

Petroleum Securities Building
LOS ANGELES

1123 Harrison St.
SAN FRANCISCO

311 East 2nd St.
TULSA, OKLAHOMA

A request for information... coupon at right... entails no obligation, and may mean lower costs and higher profits for YOUR plant....

Please send me... no obligation... copy of "21 Gas Burner Problems and Their Solution."

Name _____

Company _____

Address _____

Western Gas, June 1930

Customers waiting room of Seattle Gas Company, showing Radiantfire mantel and display.

Modern Fireplace *on* Salesfloor Serves Dual Purpose

THE new Seattle Gas Company has adopted an innovation in sales floor displays by providing a modern Radiantfire mantel on the main sales floor. The unit, together with comfortable chairs, provides both attractive sales display and comfortable lounging quarters for visiting customers who may be waiting for duplicate bills or information from the desk near by.

This is a distinct change from the old method of having customers stand before iron-barred cages or lean over counters while waiting to be served. Salesmen are enabled to engage the attention of customers waiting in these comfortable quarters, and to present the merits of heating units as well as other modern gas appliances.

Widening Natural Gas Area *on* Pacific Coast

(Continued from Page 20)

The public utilities, major oil companies, a large percentage of the small oil companies and the State of California have been greatly interested in the conservation of natural gas in the past year. Efforts along these lines have met with some success to date and it is expected that more progress will be made during this year and the years to follow.

The outstanding event was the passage of the Natural Gas Conservation Law by the winter session of the California State Legislature in 1928, the measure being signed by Governor Young in May, 1929. This law prohibits an unreasonable waste of natural gas by limiting this waste to a certain volume of gas for each barrel of oil produced. This oil-gas ratio is not the same for each field, nor is it the same for each sand in a field. It varies from 3,000 cubic feet to 20,000 cubic feet per barrel of oil produced. The proper amount of gas to be produced to give the greatest efficiency is best determined experimentally by petroleum enginers of the various companies interested in a certain area.

The success of this law will not only benefit the gas utilities by conserving their available gas and the future generations by saving this valuable fuel for their use, but it will be of great value to the oil producers or producing companies by eventually bringing in more revenue.

The importance of this law cannot be brought to the attention of those engaged in the oil and gas industry too strongly, as we all know once the gas wastes to the atmosphere it is gone forever, the end of the supply of natural gas is hastened; its wastage in huge quantities is economically criminal.

Natural gas is the prime mover of oil through the producing sands, it can be held back so as to economically produce the oil, thus reducing production expense and increasing the ultimate recovery of oil from the sands. The present over-production of crude oil would not exist today if the large amount of gas were not permitted to waste to the atmosphere in order to get the greatest possible flow from the oil wells; by conserving the gas over-production will be reduced.

The California Gas Conservation Law became effective August 1, 1929, the enforcement of it being given to the California State Division of Oil and Gas, of which R. D. Bush is the Supervisor. The first steps taken were the posting of notices on all leases in the Ventura Field notifying the producers and property owners of a hearing to be held relating to complying with the new law. At this meeting an agreement was reached whereby it was decided to carry on a test for six days to obtain the potential production of this field. After the test a second meeting was held when a curtailment program was agreed upon; its effect was to reduce the gas production from 4,600 cubic feet to 3,700 cubic feet per barrel of oil, a reduction of almost 20 per cent.

Due to over-production a movement was made to conserve oil in the Santa Fe Springs field, with no thought being given to gas conservation. The production of gas was slightly reduced, of course, but to no such extent as in the Ventura Field. In the latter field the production is in the hands of several large producing companies who are in favor of saving the gas, realizing the value of it, but in Santa Fe Springs the leases are small and under the ownership of many small companies, making it more difficult to get their cooperation. In the latter field an injunction suit was filed against all the operators and land owners to prevent them from unreasonably wasting gas. The defendants questioned the legality of the law and a decision was handed down on March 12, 1930 upholding the constitutionality of the Natural Gas Conservation Act and ordering immediate proceedings of the injunction suit brought by the State against the operators to enforce it. Similar injunction suits were filed in the Signal Hill and Kettleman Hills Fields.

The sales departments of all the gas companies in the State have been exceedingly active in their efforts to increase the consumption of gas, especially along industrial lines.

In San Francisco the Pacific Gas and Electric Company has set up an exhibit of various types of burners, ovens, regulators, etc., used in various industries. A great many hotel, restaurant and household appliances are also on exhibition, including furnaces for homes and coal furnaces which have been converted to use natural gas.

A similar exhibit on a larger scale has been set up in Los Angeles. It is known as the Natural Gas Bureau, being supported by three companies, the Los Angeles Gas and Electric Company, the Southern Counties Gas Company and the Southern California Gas Company. A whole building has been leased for this exhibit. All the apparatus is connected to the mains, forming a permanent working exhibit where practical demonstrations can be given.

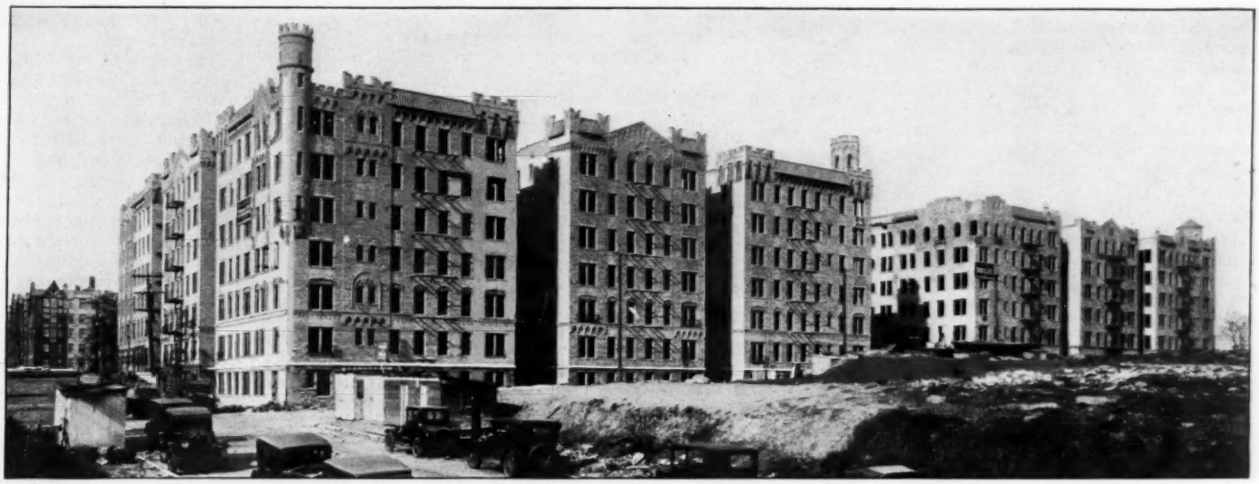
Great publicity has been given natural gas in California through advertisements in magazines, newspapers and by means of bill boards. The Pacific Gas and Electric Company even put on a series of advertisements in nationally circulated magazines in order to induce industries to move to or establish additional plants in the territory served by the company.

Present known sources of natural gas indicate a supply sufficient to serve all gas requirements of the State of California for a great many years to come. This economical fuel will materially aid in increasing the industrial activities of this great commonwealth.

E. H. COURTENAY ANNOUNCES NEW HELIUM PROCESS

E. H. Courtenay, vice-president of the Girdler Corporation, which controls the Helium Company of Louisville, Ky., operating helium plants at Dexter, Kansas, and Thatcher, Colorado, has announced a process of extracting helium from natural gas that reduces the price of helium to $35.00 a thousand cubic feet.

Still another Record Size Apartment ...*chooses* ELECTROLUX



MITCHEL GARDEN *as it appears today. Two of the six units, ready June 1. When completed, this huge development will house 1200 families*

New York's $2,000,000 Mitchel Garden Apartments in *second* record Electrolux purchase adds 21,600 MCF to yearly load

LAST MONTH you read about the world's largest apartment choosing Electrolux. 1669 refrigerators for New York's London Terrace development.

This time it's the Mitchel Garden Apartments. 1200 kitchens . . . 1200 Electrolux refrigerators!

Not every community offers such giant developments as London Terrace and Mitchel Garden, perhaps. Yet daily you see apartment houses going up about you. Dwellings with 10, 20, 30 . . . 100 apartments apiece. Every one offering a rich market for Electrolux! Suppose they averaged only 25 apartments each. Every Electrolux installed would increase billing approximately 18 MCF a year. Or, a total of 450 MCF for each apartment house.

A tiny gas flame takes the place of all moving parts.

Conspicuously successful gas companies are concentrating sales effort on gas refrigeration. They're training special Electrolux salesmen . . . securing plumber and dealer cooperation . . . merchandising the free trial offer. Because they know Electrolux transforms small domestic accounts into permanent large accounts. In addition, gives a generous profit from the sale itself. And creates new prestige for the gas industry.

For contacting housewives, architects, builders . . . we've prepared just the sales helps you'll need. Don't wait. Ask us about them today. Write, wire or telephone Electrolux Refrigerator Sales, Inc., Evansville, Ind.

AN ELECTROLUX IN EVERY KITCHEN. *This view shows entrance to one of the completed units. Plenty of light and air, beautiful shrubs and trees. Every room an outside room.*

ELECTROLUX

THE *Gas* REFRIGERATOR

Variations *in* Gas Supply *and* Appliance Operation

(Continued from Page 34)

soft flame, with an indistinct inner cone, and if given too much primary air, the flames will blow from the ports.

It was possible during our mixed gas research investigation to subject appliances to various mixtures of gases, maintaining the specific gravity, heating value, and pressure constant, and varying only the chemical composition. If too wide a variation in constituents is permitted, unsatisfactory appliance operation will result, with the same primary air adjustment. Hydrogen, on account of its high rate of flame propagation, probably has the greatest effect in determining the flexibility of gaseous mixtures. The effects of variations of hydrocarbons, inert gases, and carbon monoxide have been determined and will be presented at a later date. The effect of a change in chemical composition is shown in Fig. 5. In this instance, a shorter inner cone will be noted. Further change in chemical composition only could be made so that the burner would flash back.

Selection of test gases: With the above considerations in mind, and after making several thousand tests for combustion and burner operation, it was decided to select three test gases. It had been shown that if an appliance passed the tests with these three gases, it should pass the tests satisfactorily on all other commonly used gases. The three gases selected were:

1. 400 B.t.u. carburetted water gas, 0.7 specific gravity and high inert content of about 35 per cent.

2. 550 B.t.u. coke oven gas, 0.40 specific gravity.

3. Natural gas of 1125 B.t.u. and 0.65 specific gravity.

The 400 B.t.u. gas was chosen to represent the manufactured carburetted water gases with a comparatively high carbon monoxide, hydrogen and inert content. A low heating value and high gravity gas was selected to determine the capacity of various control devices. A high specific gravity was desirable because of the high air injection possible through its use; thus the necessity of having a good air adjustment would be disclosed.

Coke oven gas was selected primarily because of its low specific gravity and its heating value being very close to the heating value of manufactured gases generally being distributed. As previously explained, a low specific gravity gas subjects a burner to severe tests of its air injecting qualities. Natural gas of 1125 B.t.u. per cubic foot and 0.65 specific gravity, represents the natural gases, and subjects an appliance to stringent tests for completeness of combustion.

These three gases represent practically the extremes in heating values and specific gravities, as well as the tremendous variations in chemical composition of the gases commercially distributed to meet the requirements of this country.

Summary and conclusions: Problems confronting approval requirements committees in selecting test gases and test pressures have been discussed.

The effects on appliance operation of the following variables in the gas supply may be summarized briefly as follows:

1. Variations in gas pressure affect the gas rate of a given setting of the burner orifice directly as the square root of the pressures. For example, an increase in pressure increases the gas rate and tends to result in the over-crowding of the burner and incomplete combustion.

2. A change in specific gravity affects the gas rate inversely as the square root of the specific gravity; air injection increases as the specific gravity increases, and the combustion characteristics are materially altered.

3. Heating values changes are similar in effect to variations in pressure. An increase in heating value tends toward overcrowding the burner, and incomplete combustion, unless readjustment of the burner is made. A decrease in heating value tends toward flash back, and noisy burner operation.

4. Chemical composition is probably the controlling factor in considering the effect of various gases on appliance performance. Results of changing the hydrogen, hydrocarbon, carbon monoxide and inert content of gases maintaining the heating value, specific gravity and pressure constant, are available to accredited company members of the American Gas Association upon application to the Association headquarters. These data, it is hoped, will be published at a later date.

The test gases and test pressures being used for national approval of gas appliances are listed below:

1. 400 B.t.u. carburetted water gas, 0.7 specific gravity, normal pressure 3½ inches.

2. 550 B.t.u. coke oven gas, 0.4 specific gravity, normal pressure 3½ inches.

3. 1125 B.t.u. natural gas, 0.65 specific gravity, normal pressure 7 inches.

As a result of this wide range of test conditions, gas appliances bearing our Laboratory Seal of Approval are flexible in their operation, and may be operated satisfactorily under widely different service conditions.

Missouri Utilities Group *in* Largest Convention

THE 24th Annual Convention of the Missouri Association of Public Utilities was held on May 1, 2 and 3 at Springfield, Mo. Business sessions took place in the Kentwood Arms Hotel, and the annual banquet and entertainment, on the evening of May 2, at the Shrine Mosque.

Officers elected to serve for the coming year were: H. M. Patton, district superintendent of the Union Electric Light & Power Co., St. Louis, Mo.; for first vice-president, A. E. Bettis, Kansas City Power & Light Co.; second vice-president, Fred Karr, St. Joseph Gas Co.; third vice-president, Worth Bates, Missouri Gas & Electric Service Co., Lexington, Mo.; treasurer, Hermann Spoehrer, Union Electric Light & Power Co., St. Louis, Mo.; secretary, F. D. Beardslee, Mercantile-Commerce Bank & Trust Co., St. Louis, Mo.; assistant secretary, Jesse Blythe, Jefferson City, Mo.

Major T. J. Strickler, retiring president, vice-president and general manager of the Kansas City Gas Co., was elected a member of the executive committee. Other members of the executive committee re-elected were: A. E. Reynolds, Springfield, Mo.; W. H. Henby, University City, Mo.; Hermann Spoehrer, St. Louis, Mo.; L. P. Andrews, Sedalia, Mo.; C. A. Semrad, St. Joseph, Mo.; Chester C. Smith, Kansas City, Mo.; S. W. Greenland, St. Louis, Mo.

This year's convention was the largest the Association has ever held. A large number of delegates were accompanied by their wives. A special entertainment program was arranged for the visiting ladies.

Membership in the organization is comprised of representatives of gas, electric light and power, water and electric railway companies in Missouri.

The committee in charge of the program was composed of Paul C. Ford, Kansas City Gas Co., chairman; H. H. Kuhn, Kansas City Power & Light Co.; Edward L. White, Laclede Gas Light Co., St. Louis; L. W. Helmreich, Capital City Water Co., Jefferson City; Charles Greason, Gas Service Co., Kansas City; Stanley Clarke, St. Louis Public Service Co., St. Louis.

Major T. J. Strickler, president of the Missouri Association of Public Utilities in his address May 1, opening the convention, said that more than 13,500 homes in Missouri are now heated with gas.

Milton R. Stahl, chairman of the Missouri Public Service Commission, in an address on "The Regulation of Utilities" urged that the power of the Commission be broadened to give the Commission jurisdiction over holding companies of local utilities, and supervision over the sale of stock in Missouri by holding companies.

He opposed federal control over electric rates where electrical energy is transported across state lines.

M. B. Buckley, new business manager of the Kansas City Gas Company, spoke on "Heating Homes With Gas."

Mrs. Elizabeth Minish of the Laclede Gas Light Company spoke on the "Utilities' Service in the Home."

The annual banquet and carnival were held on the night of May 2 at the Shrine Mosque. The principal address was made by Earle W. Hodges, of New York City, Director of Public Relations of Henry L. Doherty & Co.

The place of holding the next annual convention will be selected by the Executive Committee at its meeting in June.

INDUSTRIAL CONSUMERS OF LONE STAR SUBSIDIARY NUMBER 687

A total of 687 industrial consumers are supplied with gas from the mains of the Community Natural Gas Company, according to a recent report made by E. J. Hatzenbuehler, head of the industrial department of the Lone Star Gas Company, affiliated organization.

This total embraces 39 different industries with public schools, gins, cleaning and pressing establishments, bakeries, hotels and apartments, laundries, oil mills, ice plants and creameries ranking highest in the list of users.

L. A. G. AND E. EMPLOYEES GET LIFE SAVING MEDALS

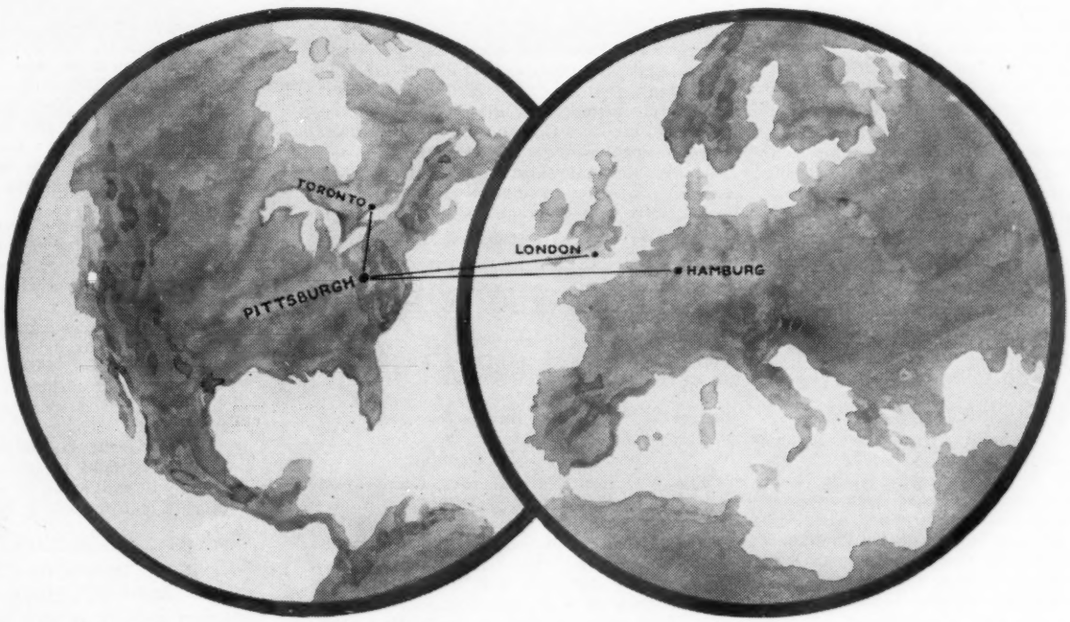
Two employees of Los Angeles Gas and Electric Corporation of Los Angeles, California, were recipients of medals for saving life by means of artificial respiration, the medals being presented by President Addison B. Day, at an employee meeting on May 26.

E. M. Wiseman of the electric distribution department was given the Samuel Insull Medal for the successful use of the prone pressure method of artificial respiration, and Arthur M. Capps of the gas distribution department received the "Presidents Medal" of the National Safety Council.

LANE, KANSAS, GRANTS FRANCHISE TO MISSOURI-KANSAS P. L. CO.

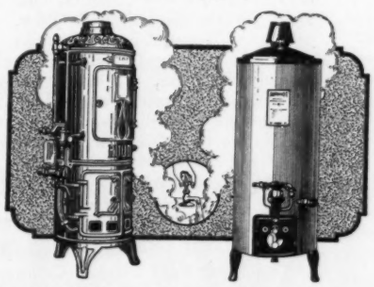
Missouri-Kansas Pipe Line Company has obtained a franchise for the service of natural gas in Lane, Kansas.

RUDD-AUTOHOT



The World Has Been Its Proving Ground

1. ***Pilot Lock***
2. ***Pilot Adjustment***
3. ***Improved Tank***
4. ***Brass Parts Dipped***
5. ***Hard Brass Gas Line***
6. ***Seamless Draft Hood***
7. ***Improved Leg Bracing***



The RUDD Small Home Twins

In the ultimate of all tests . . . . actual and everyday use . . . RUUD engineers have watched and checked the operation of the RUUD-AUTOHOT Automatic Storage Water Heater in the United States, Canada, England, Germany, Holland, Norway, Russia, Japan . . . . in *every gas-served country.*

All agree that its structural principles are correct, but from their wealth of experience drawn from actual observation, new and striking improvements have come to light that are now made a part of a new, finer RUUD-AUTOHOT.

Thus to you, through this internationally-famous name, comes renewed assurance of a water heater value never before equalled . . . . *now made greater.*

RUUD MANUFACTURING COMPANY
Pittsburgh, Penna.

LOS ANGELES SAN FRANCISCO PORTLAND DENVER
DALLAS FORT WORTH SAN ANTONIO HOUSTON
OKLAHOMA CITY NEW ORLEANS KANSAS CITY ST. LOUIS

HAVE YOU SEEN THE TEN TO ONE MERCHANDISING PLAN? WRITE FOR IT.

Protecting Pipe *for* Service *in* Swampy Soils

(Continued from Page 27)

thus cupped, pieces of wire are run around them and tightened, drawing the edges of the sheet iron within five inches of each other at the top. Through this opening the asphalt is poured.

In coating pipe with asphalt, the Houston Pipe Line Company has followed the practice of priming the pipe with a light asphalt base before lowering it into the trough for the main asphalt coating. Asphalt used for work of this kind should be such that it will not be brittle or harden to the extent that it will crack or break, thus assuring an impervious and thoroughly corrosion-resistant coating.

Since making this experiment, the company has learned that the asphalt coating idea was tried many years ago on a small line in Mexico, purely because there was a large amount of asphalt on the property and that there was no market for it at the time. This coating, applied very generously and in an open ditch, was put on the line in 1907. The line was virtually buried in a ditch full of asphalt, a practice that would be prohibitive in cost under ordinary circumstances. The line was taken up in 1926, and was in perfect condition after 19 years in the ground.

In several instances, notably in the case of the Gulf Pipe Line Company in North Texas and the Standard Oil Company in Louisiana, pipe lines have been protected by concrete in much the same manner as the Houston Pipe Line Company is using asphalt. Good results have been obtained with the concrete, but that substance has the disadvantage of being susceptible to penetration by moisture and to cracking with expansion of the pipe.

Announce Details *on* No. Natural Gas Corp. Project

THE Northern Natural Gas Corporation, a holding company formed under the laws of Delaware, by the United Light & Power Company, the North American Light and Power Company and the Lone Star Gas Corporation, now constructing a 24-inch line from the Panhandle gas field in Texas, through western Oklahome and eastern Kansas into eastern Nebraska and central western Iowa, proposes to have natural gas available at Lincoln, Nebraska, around the first of August, according to announcement.

Actual construction of the line, which will tap the Stevens county gas fields in Kansas, is well under way, with Smith Bros., Inc., of Dallas, having the contract for the line, north from Clifton, Kansas, and Knupp & Fredell of Amarillo handling the construction work south from Ashland, Kansas.

The Lone Star Gas Company has charge of the construction of all compressor plants and all river crossings that require more than a single line. Three compressor stations will be constructed on the line, with the probability of additional plants being built at the end of the first year. The three plants on which construction is now beginning will be located at Clifton, McPherson and Medicine Lodge in Kansas.

Entire ownership of the Northern Natural Gas Company is vested in the three companies, the Lone Star Gas Corporation owning 30 per cent of the project and the United Light & Power Company and the North American Light & Power Company each owning 35 per cent of the project.

The officers of the holding corporation are: Clement L. Studebaker of Chicago, president of the North American Light & Power Company, chairman of the board; William J. Chamberlain of Chicago, president of the United Light & Power Company, president; L. E. Fischer, vice-president of the North American Light & Power Company, and L. B. Denning, president of the Lone Star Gas Corporation, vice-presidents.

The executive committee are: B. J. Denman, vice-president of United Light & Power Company; L. E. Fischer and L. B. Denning; H. A. Berta, treasurer of the North American Light & Power Company, treasurer; D. A. Hulcy, assistant to the president of the Lone Star Gas Corporation, secretary. The Lone Star is represented on the board of directors by T. B. Gregory, F. W. Crawford and L. B. Denning.

The Northern Natural Gas Corporation will operate the line through several subsidiaries, a pipe line company, a production company, and companies to operate the gathering system and the distribution systems. The holding company will own the entire capital stock of these corporations, with no part of the common stock of the holding company or its subsidiaries being offered to the public. The pipeline company will operate under the name of the Missouri Valley Gas Company.

Gas will be supplied through the line to approximately 50 towns in Nebraska and Iowa, with the three principals to the line already owning gas franchises in many of the important cities.

The United Light & Power Company operates manufactured gas plants at Lincoln and Beatrice, Nebraska; Shenandoah, Red Oak, Mason City and Fort Dodge, Iowa. The North American Light & Power Company owns a manufactured gas plant at Des Moines, Iowa, and the Lone Star Gas Corporation, a manufactured gas plant in Council Bluffs, Iowa.

Headquarters for the Northern Natural Gas Corporation will probably be located at Omaha, Nebraska.

Gas for this major project, in addition to coming from the Panhandle fields of Texas will also come from the gas-producing territory near Hugoton, Kansas, in Stevens County. The entire output of some 300,000 acres of gas-producing property in this territory was purchased from the Moody-Seagraves Corporation.

BLUE STAR HOME GETS HOUSE-WARMING

On May 4 Walter M. Thurber, manager of the advertising and publicity department for the Southern Counties Gas Company, Los Angeles, held official open house to his friends of the gas industry at his new home in Altadena, Calif. He displayed with pride a Blue Star Certificate signed by Alexander Forward, managing director of the American Gas Association, and by F. S. Wade, president and F. H. Bivens, vice-president of the Southern Counties Gas Company. Gas burning equipment in the new home includes range, refrigerator, furnaces, water heater, and radiant type space heaters.

Railroad Commission Gives Approval *to* Merger

THE California Railroad Commission on May 1 authorized the $650,000,000 merger announced by President A. F. Hockenbeamer of Pacific Gas and Electric Co., San Francisco, in the April issue of *Western Gas*. This brings the Great Western Power Company, the San Joaquin Light and Power Corporation, and various other utilities formerly controlled by the North American Company of New York under the ownership of the P. G. and E. All of the North American Company's California interests have been turned over to Pacific Gas and Electric in an exchange of 1,820,000 shares of common stock.

About 62 per cent of the outstanding stock of the Great Western Power Company, about 52 per cent of the stock of the San Joaquin Light and Power Corporation and all the stock of the Midland Counties Company, which had previously been held by the North American Company through the Great Western Power Corporation, will be acquired by the P. G. and E. in exchange for 1,825,000 shares of P. G. and E. with a par value of $45,625,000.

The merger is the largest transaction in the public utility field to be made in California, and will make the P. G. and E. the third largest public utility in the United States.

UNUSUAL DIFFICULTIES MET ON ALBUQUERQUE LINE

Construction work is now under way on the 175-mile, 12-inch natural gas line from the Ute Basin in northwestern New Mexico to Albuquerque and Santa Fe. About 15 miles of main have been laid, and 15 miles of telephone lines have been strung. Many unusual difficulties are encountered in the construction of this carrier. Machinery must be hauled 90 miles and water for the construction camps must be hauled from 15 to 20 miles. Fifty bridges must be constructed on the road which parallels the line in order to transport equipment. About 700 men are now employed, and work is expected to be complete in less than eight months, the scheduled time.

"UNIVERSAL OIL REVIEW"—NEW TYPE HOUSE ORGAN

As an innovation in company house organs Universal Engineering Company of Los Angeles has begun publication of the "Universal Oil Review", which comes from the press for the first time in June. The journal is a 16-page magazine-size issue comprising a digest of current technical literature drawn from the trade press, technical meetings, and similar sources. Those desiring the new publication may receive it at no charge by addressing the Universal Engineering Company at 2369 East 51st Street, Los Angeles.

STATE FUEL BUILDS LINE TO GOTEBO, OKLA.

The State Fuel Supply Company has under construction eight miles of gas pipe line from Mountain View, Oklahoma, to Gotebo. A distribution system is also being constructed by the company at the latter place. During 1929 the company constructed about 50 miles of gas main in southwestern Oklahoma.

Metairie Park Country Day School, New Orleans, La.

ERECTED 1929, ARMSTRONG & KOCH, *Architects*, New Orleans, La.

CLOW GASTEAM FOR SCHOOL HEATING

TYPE OF CONSTRUCTION AND HEATING REQUIREMENTS

13″ plain brick, plastered inside.
Ceilings—lath and plaster—height 12′ 0″.
Roof—Slate on wood sheathing.
Floors—Double wood.
Windows and doors—(not weather-stripped).

Cubical Content	80040 Cu. Ft.
Sq. Ft. Floor Space	6670 Sq. Ft.
Seating Capacity	160

School heating is another type of installation in the wide market for gas sales with Clow Gasteam radiators. In this field Clow Gasteam especially demonstrates its applicability to variable heating needs. For a single room or an entire large building, Clow Gasteam offers a market for gas sales that is almost unlimited.

Degree days	1023
Exposed walls	6060 Sq. Ft.
Total glass and doors	1325 Sq. Ft.
Floors	6670 Sq. Ft.

CLOW GASTEAM RADIATORS INSTALLED

	List Price	Radiation Sq. Ft.
2— 5 sec. 4 tube 26″ Vented	$100.00	30
1—11 sec. 4 tube 26″ Vented	79.00	33
1—13 sec. 4 tube 26″ Vented	89.00	39
4—15 sec. 4 tube 26″ Vented	388.00	180
2—25 sec. 4 tube 26″ Vented	288.00	150
4— 5 sec. 4 tube 38″ Vented	224.00	112
1— 7 sec. 4 tube 38″ Vented	69.00	39
1— 9 sec. 4 tube 38″ Vented	82.00	50
1—11 sec. 4 tube 38″ Vented	95.00	61
5—13 sec. 4 tube 38″ Vented	540.00	360
2— 7 sec. 6 tube 31″ Unvented	146.00	178
24	$2100.00	1232

OPERATING COST—(with Natural Gas) Season 1929-1930*

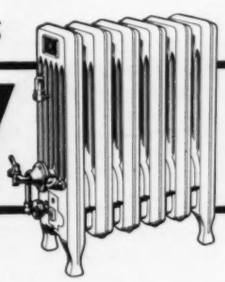
November, 1929	$ 34.05
December, 1929	73.60
January, 1930	50.32
February, 1930	130.00
March, 1930	70.12
	$358.09

Price of Gas:
$1.00 for first three hundred cubic feet
1.84 for first thousand cubic feet
.90 all over first thousand cubic feet

*Includes gas used for water heating and cooking.

JAMES B. CLOW & SONS 201-299 N. Talman Ave., Chicago

CLOW GASTEAM



Listed by Underwriters Laboratories

Approved by A. G. A. Testing Laboratory

Successful team in Pacific Safety Conference competition. Left to right: W. A. Bahr, J. J. Wogan, Oscar Skog, N. E. Smith, R. O. Fancher, W. C. Smith (captain), and D. Martello.

Sacramento Division Wins First Aid Victory

AT the Annual California Industrial First Aid Contest and the 7th annual Pacific Safety Conference held May 16 at the Scottish Rite Auditorium, San Francisco, 17 first aid teams, representing California industries, competed for prizes awarded by the Conference.

The first prize in the contest was won by the first aid team of the Pacific Gas and Electric Company, composed of employees of the Gas Department of the Sacramento Division. The team was directed by William Bahr and consisted of W. C. Smith, J. J. Wogan, Oscar Skog, R. O. Fancher, D. Martello and N. E. Smith, Captain.

The team representing the Richfield Oil Company of Southern California won the second prize. The third prize was won by the Shell Oil Company team and the Pacific Portland Cement Company won the fourth prize.

In connection with this conference, the Pacific Coast Gas Association held its annual first aid contest, entries being limited exclusively to gas company teams. The first prize in the P.C.G.A. contest was won by the Sacramento men's team of Pacific Gas and Electric Co., and the prize for the women was won by the San Joaquin Light and Power Company.

A. G. A. Inaugurates Household Information Service

A HOUSEHOLD Information Service is being added to A. G. A. staff activities, effective July 1, 1930. It consists of a monthly proof or press sheet, available to all member companies of the American Gas Association, containing articles and illustrations for use in the woman's pages of newspapers in every community where gas is distributed. In addition to the proof sheets, which will be published in duplicate, one set of matrices of both illustrations and text will be furnished monthly with each subscription for the service, for local use of the subscriber.

A nominal fee will be charged for this service, calculated to defray its preparation cost, and to support, at least in a measure, the development of a similar service for the household and woman's magazines of national circulation, for which service there is a growing demand.

Miss Marie Hulser, who will edit this new service, comes to the Association after several years in this field of informational news service, the past two years having been associated with the national headquarters of the "Save the Surface Campaign," in the capacity of director of educational publicity, and editor of that organization's syndicated magazine. Previously she was associated with the New York Daily News and the publicity department of Columbia University.

Through the new service, local member companies have available a program of educational publicity directed to the homemaker—the purchaser of about 85 per cent of domestic gas sales. Further information on the service, subscription price, etc., may be had by addressing Household Information Service, care Miss Marie Hulser, or Keith Clevenger, Director, Publicity and Advertising, American Gas Association, 420 Lexington Avenue, New York.

APPLICATIONS FOR SERVICE OF BUTANE GAS CONSIDERED

Application has just been made to the Railroad Commission by the Natural Gas Corporation of California for permission to serve liquefied natural gas in the cities and towns of Jackson, Amador County; Placerville, El Dorado County; Lakeport, Lake County; Susanville, Lassen County; Alturas, Modoc County; King City, Monterey County; Auburn, Placer County; and Sonora, Tuolumne County.

At the present time there are before the Commission applications by three companies, namely, Natural Gas Corporation of California, West Coast Gas and Fuel Company and Inland Empire Gas Company, for permission to serve liquefied natural gas to a total of 65 cities and towns in California. These communities are spread over the entire state from Crescent City and Yreka on the north to Holtville on the south.

The proposed service consists of the delivery of a mixture of vaporized butane, propane and air through distribution gas mains in the same manner as natural gas is distributed. The same type of gas mains, gas meters and gas regulators would be used as in the case of either natural gas or manufactured oil gas, and the same type of gas appliances would be used to burn the gas.

The applicant utilities request permission to distribute a mixture of butane, propane and air which would have a heat content of 550 B.t.u. per cubic foot. Such a mixture is not explosive and could be burned in the same manner as manufactured or oil gas. This mixture has been successfully used in a number of Western cities for several years past.

Pfeiffer *and* Hicks Get New Byllesby Posts

W. H. HODGE, vice-president and manager of the Sales and Advertising Department of Byllesby Engineering and Management Corporation, announces the appointment of T. P. Pfeiffer as advertising manager of that corporation,

T. P. Pfeiffer *Joseph W. Hicks*

and of Standard Gas and Electric Company. Appointment of Joseph W. Hicks as publicity director for these two companies was also announced. Mr. Hicks will remain in charge of company publications.

Mr. Pfeiffer has been with Byllesby Engineering and Management Corporation in the advertising department since January 1, 1922. He was associated with the Louisville Gas and Electric Company for about 10 years before joining the Byllesby staff. He has served for two terms as secretary of the Public Utilities Advertising Association and is now a member of the Association's Better Copy Committee.

Mr. Hicks became a member of the Byllesby organization in December, 1925, coming to that company from an editorial post with the Oklahoma City Times. Mr. Hicks was active in journalistic work in the middle west and on the Pacific Coast for several years, both prior to and following graduation from Oklahoma University in 1923. For the past five years he has been a member of the faculty of Medill School of Journalism at Northwestern University.

There are Many Models for Many Uses

Church installation of Roper range No. 27-82, with high shelf

The alert salesman knows that there are many places besides hotels and restaurants to sell hotel and restaurant equipment. Women's clubs, churches, fraternal orders and large homes are all in the field for medium and heavy duty ranges.

Clubs and fraternal orders are generally under-manned in their kitchen staff, and they need the best equipment to compensate for this.

Churches are often getting by with make-shift batteries of domestic ranges. They are ripe for a replacement talk.

Large homes, where hundreds of guests are entertained, need more than just a domestic size stove.

There is a Roper range, or battery of ranges, designed for every use, from the bungalow to the biggest restaurant in the city.

And every Roper range is economical in gas consumption—this you already know.

ROPER

TRADE MARK REG. U.S. PAT. OFF. REG. IN CANADA

GAS RANGES
GAS FURNACES

George D. Roper Corp., Rockford, Ill.

C. B. BABCOCK CO.
135 Bluxome St.
San Francisco

Active Progress Reported *on* P. G. and E. Lines

REPORTS on the extension of the Pacific Gas and Electric Company's natural gas transmission lines into central and northern California reveal rapid construction progress. The section of the natural gas line being constructed in the San Joaquin Valley under joint ownership of the Standard Oil Company and the Pacific Gas and Electric Company and known as the Standard-Pacific natural gas line, has been placed in operation from Kettleman Hills to Pittsburg. It consists of 126 miles of 26-inch pipe, 25 miles of 24-inch and 15 miles of 22-inch pipe. This line is being extended to tie in with the Pacific Gas and Electric Company's line at Richmond, and will complete a second line into the metropolitan bay area, tying in with the Pacific Gas and Electric Company's coast line which was put into operation last fall.

The Stockton-Sacramento 16-inch branch line of the P. G. and E. Co., is completed as far as Thornton.

The Tracy Junction-Milpitas 22-inch line, 37 miles in length, has been completed, making natural gas available for Livermore and Pleasanton. The completion and operation of this line creates two sources of supply at Milpitas, one from Kettleman Hills and one from Buttonwillow fields, one line coming north via Hollister and San Jose and the other via the San Joaquin Valley.

From Milpitas, branch lines extend up the bay, one serving San Francisco and peninsula territory and the other serving Oakland and Eastbay cities.

Crews are now actively engaged in the laying of a 17-mile line which taps the Sacramento-Stockton line near Manteca. This line will be extended to Modesto and is scheduled to be completed about July 1. When tapped, it will make natural gas available for Ripon, Salida, Oakdale and Riverbank.

Pipe is arriving for the P. G. and E. extension of natural gas mains into the North Bay territory via the Carquinez Bridge.

Change-over work in Oakland is being completed by appliance adjusting crews and it was anticipated that all of the consumers in the Eastbay cities will be using straight natural gas by the last of May. At that time, the entire crew of approximately 1,000 men will be transferred to San Francisco, in which city the change over will be entirely completed early in July.

SOUTHERN NATURAL TO CONSTRUCT 800 MILES ADDITIONAL LINE

J. H. WHITE, president of the Southern Natural Gas Corporation, has announced the construction of approximately 800 miles of additional gas line by his company, and affiliated companies, the Mississippi Natural Gas Corporation, Georgia Natural Gas Corporation and Alabama Natural Gas Corporation.

The extension will involve the expenditure of approximately $15,000,000 and will carry gas to Meridian, Jackson, Laurel, Hattiesburg, Moss Point and Pascagoula, Mississippi; Selma, Montgomery, Mobile, Opelika, Auburn and Brickyard, Alabama; and Macon, Griffith, and Milledgeville, Georgia, as well as to other towns adjacent to the gas line.

The project is scheduled to be completed around October 1, with the pipe line to Meridian, Miss., and the distribution plants at Starksville, Miss., Leeds, Ala., and Carrolton, Georgia, now being well advanced in construction.

Of the total expenditure of $15,000,000, Mr. White states that about half of this amount will be expended in Mississippi, $4,500,000 in Alabama; and $3,000,000 in Georgia.

Contracts are held by the Southern Natural with the local distribution companies in Jackson and Hattiesburg, Miss.; Selma, Montgomery and Mobile, Alabama; and Macon and Griffin, Georgia.

The original line of the Southern Natural from the Monroe fields to Atlanta was around 900 miles. With the completion of the new unit, a total of approximately 1700 miles of transmission line will be operated supplying gas to a territory with an estimated population of 1,300,000. The total investment of the company and affiliated companies in Louisiana, Mississippi, Alabama and Georgia will represent approximately $40,000,000, at completion of the new project.

E. A. PEAT CHAIRMAN OF BOARD FOR McEVERLAST, INC.

E. A. Peat, for 17 years treasurer and comptroller of the Southern California Gas Company, has resigned effective June 1 to accept the position of chairman of the board and secretary-treasurer of McEverlast, Inc., Los Angeles manufacturer of pipe coating and paving products. Mr. Peat was treasurer and comptroller of the Southern California Gas Company during its growth from a few thousand customers to its present service of more than 240,000 customers.

E. A. Peat

Coincident with Mr. Peat's acceptance of his office with McEverlast Inc., that company is launching an expansion program which will carry its marketing activities into wider channels. Associated with Mr. Peat in the company's direction will be A. M. Schenk, president, who continues in the active management of the company; Kenton A. Miller, vice-president and general counsel; and J. V. Schertz, assistant general manager; Alec McRae, one of the organizers of the company, will continue to supervise all manufacturing activities. O. A. Stellar was recently named advertising manager for the firm.

HENRY H. NELSON NOW HEADS WARD HEATER COMPANY

HENRY H. NELSON, former manager of the New York Sun, has purchased the Ward Heater Company, which manufactures the Ward Furnace. The company's plant is located in Los Angeles.

Mr. Nelson, now president of the Ward Heater Company, announces plans for an expansion program which will double the company's manufacturing facilities and financial resources.

W. J. Kerr retains his position as general manager of the company. Under his direction an extensive advertising campaign is under preparation, for launching in the fall. The company's policy of close cooperation with gas company merchandising departments in the distribution of its furnaces will be continued, and the advertising campaign now being prepared, involving use of direct advertising, newspapers, trade journals, and other media, is designed to link up with utility merchandising.

Walter M. Berry of Los Angeles has been retained as consulting engineer for the Ward Heater Company, and other technical staff additions are contemplated.

The Ward company was established in 1914 and is one of the oldest firms engaged in manufacture of gas heating equipment in the West. Distribution offices are maintained in principal western centers and representation is also established throughout the east. Over 200,000 Ward furnace units are now in service. The company recently introduced a 50,000 B.t.u. unit for public buildings and larger residences.

HONOLULU GAS CO., LTD., ORDERS NEW EQUIPMENT FROM COAST

Honolulu Gas Company, Ltd., of Honolulu, Hawaii, has contracted with the Jones Gas Process Corporation for the erection of a twin shell oil gas generator, of 4,000,000 cubic feet capacity, with one primary and one secondary scrubber, and wash trays. A steel building and the necessary auxiliaries in the way of blowers, pumps, control, etc., have also been ordered.

Work on the foundation of the new plant is started, and the construction is expected to be complete by November 15, according to Frank Q. Cannon, manager of the company. The expenditure will be financed by the sale of stock at par $20 to the present stockholders.

Growth of the company's send-out from 500,000 cubic feet per month in 1906, to 40,000,000 cubic feet monthly at the present time calls for the enlargement of the plant and distribution system.

SO. COUNTIES SALESMEN REWARDED FOR WATER-HEATER SALES

Five of Southern Counties Gas Company salesmen were presented with prizes for their work in a recent water heater contest staged by the company. Presentation was made by Vice-President F. H. Bivens at the monthly sales dinner held at company headquarters in Los Angeles. James Merigold won first prize of $75; J. Criddle and Robert Gibbs tied for second place and were given second and third prize money, $37.50 each; Charles Fenton took fourth place with $15, and J. W. Peacock won the fifth prize of $10. The first four prize-winners were all of the Orange County District, while Mr. Peacock represented Santa Monica District.

The company is now running campaigns on refrigeration and range sales. A quota of 1,020 gas refrigerators has been set for 1930.

FOOD PRESERVATION SHOW IS COOPERATIVE EVENT

The New Orleans Food Preservation show was held in the New Orleans Public Service Building, New Orleans, on April 28 to May 3, and featured a "fashion show in modern refrigeration." Prizes totaling $150 were given on each of the six days of the show. The exhibit was open 12 hours daily, and was staged by the New Orleans Food Preservation Ass'n., which is composed of seven refrigeration dealers of New Orleans.

"MATERIALS FOR THE STUDY OF PUBLIC UTILITY ECONOMICS"

The Macmillan Company of New York has recently brought from the press Herbert B. Dorau's "Materials for the Study of Public Utility Economics." This 975-page book presents the business aspects and important features of the management of public utilities and their regulation. Growth and change in the public service industries are reviewed, the material coming from economic, legal and technical sources.

IDEAL GAS BOILERS

give owners basements like these . .

● Homes can be really modernized when Ideal Gas Boilers are installed. The basement can be turned into additional living quarters that are clean and comfortable. The illustrations on this page will give you some idea of how owners are transforming their basements with the help of Ideal Gas Boilers.

● Ideal Gas Boilers burn noiselessly, cleanly, efficiently and automatically. They require no fuel storage or handling. The fuel comes from the same inconspicuous pipe as the fuel for the gas range. They require no ash removal. The fuel is entirely consumed without soot or dirt.

● These features which insure healthful even temperature throughout the house—with luxurious freedom from care—which give livable additional space for den, workshop or playroom, appeal to every home owner who is planning to modernize and to everyone who is planning to build or buy.

● We'll be glad to tell you more about this modern equipment if you will write us.

Manufactured by

AMERICAN RADIATOR COMPANY

Distributed by

AMERICAN GAS PRODUCTS CORPORATION

CHRYSLER BUILDING, NEW YORK

PATENTED

Martin Unit Gas Furnaces

ARE THE RESULT OF 38 YEARS HEATING EXPERIENCE
MADE IN FOUR SIZES
Electric, Thermostat or Manual Control
Approved by A. G. A. Laboratory and by the City of Los Angeles
Write for your copy of "Modern Heating Methods"

PHILLIPS HEATING, VENTILATING & MFG. CO.
1710 W. Washington St.
Los Angeles, California

Live Agents Wanted

TESTING LABORATORY AGA APPROVED

THE BABY DIGGER

The Ideal Modern Way To Dig Gas Trench!

Cleveland Baby Diggers are unequalled for downright usability and trenching satisfaction. Compact — transportable — economical. Tough — fast — dependable. Precision built of finest materials. A wheel type trencher on full crawlers. You'll find Cleveland Trencher pioneering the features that count. Write for particulars.

THE CLEVELAND TRENCHER COMPANY
"Pioneers of the Small Trencher"
20100 St. Clair Ave.
Cleveland, Ohio, U. S. A.
Distributed By
Edward R. Bacon Co., San Francisco, Cal.
Frank T. Hickey Co., Los Angeles, Cal.

Is *the* Special Sale Justified?

(Continued from Page 31)

do not consider that we are sacrificing legitimate profits, for we are securing a satisfied user whose purchase would not have been made except for the special sale inducement. This causes us to believe that the lower price is entirely justified.

"As to the statement of Mr. Blank, that is something which can be handled by the salesman. The remark which this gentleman made was in the form of an excuse for not buying, and simply indicated that he was not thoroughly sold. All of us have this same thing to contend with at our favorite stores. We buy apparel today which may be marked down in price next month.

"Also, we believe that you will admit that by continually agitating gas appliances we are appealing to the desire of everyone to have better appliances in their home. This in turn increases the use of gas and brings to us those customers who may be using other forms of fuel. This means additional business, and the fact that the new appliance works so much better than the old appliance in itself will mean an additional load even though the new appliance is more efficient.

"I feel that too much emphasis cannot be placed on the necessity of improving the general run of gas appliances in use in our customers' homes. One reason that the gas business occupies a secondary place in the customer's mind today is that so many homes are equipped with obsolete gas appliances. People are prone to compare these antiquated appliances with modern electric appliances. Naturally the reaction is unfavorable to gas. In the face of this situation, it is evident that the replacement of worn out, unsatisfactory gas ranges, mentioned in your letter as involving a loss in gas sendout, is in the ultimate analysis a prime sales responsibility. If we do not replace these old stoves with new improved appliances, we are going to lose the cooking load entirely. The experience of all of us will prove that when we obtain a new automobile, or any other new article which gives us increased satisfaction, we will automatically use that particular thing more than the old unsatisfactory one which it replaced. This is true of a new gas range and this fact will offset the loss in gas used through the inefficient appliance, and at the same time will create a much better reaction in the minds of our customers toward the gas company.

"It would be much more pleasant from several standpoints if we could adopt a more passive sales plan, but it would be stimulating neither to the salesman nor to the organization—and the same may be said of the effect which such a policy would have upon the public. Our salesmen would soon settle back into a delightful coma; the sales department would lose the stimulus which keeps them continually driving, and the enthusiastic punch would soon be lost. A periodic revival of interest is not enough.

"To bring the problem down to cases, I have watched the different leading merchants in my city with their sales, month in and month out, week in and week out. Sometimes the sales hit me when I am ready to buy, and sometimes they do not. If I am in a humor to buy and in need, the sale clinches me and I buy quickly. The present-day merchandising seems to favor the slightly 'noisy' method. The average fellow (in which class I seem to fall) reacts to this approach and will buy at a sale something which he can actually get along without.

"I feel that we should not judge these appliance sales that we are conducting by the few minority reactions which we get, but rather by the success of the enterprise. This is really the determining factor. So long as the gross is substantial we know that we are bound to increase our gas send-out. It is gross merchandise business that brings about increased gas send-out, and if we obtain a satisfactory gross there is no question but what the net will also be there. When we get both of these we have largely accomplished our objective.

"I assure you that my job would be much easier if we did not have this continual agitation involved in conducting one drive after another; but I am afraid that I would not put the job over if it were not for the continual extra effort which is necessary. I agree, however, that we should avoid having one stove sale after another, but I strongly believe that these sales, at proper intervals—that anticipate seasonal demands —are the needed impetus to successful merchandising."

Yours very truly,
General Commercial Manager.

SOUTHERN CALIF. GAS CO. BUYS TURLOCK GAS CO. SYSTEM

Authority has been granted by the State Railroad Commission to Southern California Gas Company of Los Angeles, Calif., to purchase Turlock Gas Company, operating in and around the city of Turlock, Stanislaus County. Purchase price is announced as $145,118.32.

SIX THOUSAND MILES OF GAS LINES IN OKLAHOMA

New maps issued by the Oklahoma Utilities Association, of which E. F. McKay is general manager, show approximately 6,000 miles of gas transmission lines in the state of Oklahoma. This figure represents an increase of approximately six times the number of miles in existence eight years ago.

RANGE OIL & GAS GETS PERMIT TO EXPORT CANADIAN GAS

Range Oil & Gas Company, of Calgary and Lethbridge, Alberta, has been granted a license by the Canadian Government and by the Alberta Provincial Government for the exportation of gas from the Rogers structure southeast of Lethbridge on the Alberta-Montana border.

This license would clear the way for linking up southern Alberta gas fields with pipe lines projected to metropolitan centers in Montana.

GULF CITIES NATURAL GETS WOOSTER FRANCHISE

Gulf Cities Natural Gas Company of Houston, Texas, has been granted a natural gas franchise in Wooster, Texas.

On Their Way

A change in ownership—a change in name—a change in management—and the Seattle Gas Company, under the leadership of James Pollard, General Manager and J. Earl Jones, Sales Manager, steps up into the ranks of active merchandisers.

Of course, an order for Humphrey Radiantfires was one of the first placed. And Seattle will come to know more and more the healthful sun-like heat that has made Radiantfire one of the greatest names in the appliance industry.

The HUMPHREY Radiantfire

TRADE MARK REG. U.S. PAT. OFF.

Pacific Coast Manager
C. B. Babcock
135 Bluxome St.,
San Francisco

Manufactured by
General Gas Light Co.,
Kalamazoo,
Michigan

Sprague Semi-Chrome Leather

Resists Acids
and Boiling Water

Now Used in All

Sprague Meters and Regulators

After

Five Years' Tests and Experiments

May we send you samples and data

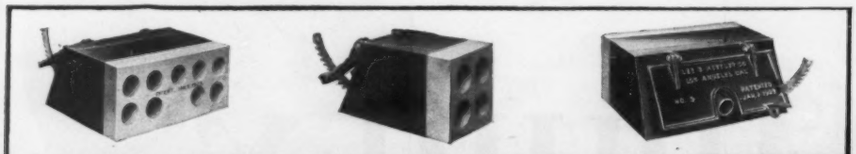
The Sprague Meter Co.

BRIDGEPORT, CONN.

Los Angeles, Calif., San Francisco, Calif.

Newark, Ohio

Davenport, Iowa Houston, Texas



Mettler Entrained Combustion Gas Burners

FOR ALL Purposes Kinds of gas Pressures

406 S. Main St. LEE B. METTLER. CO. Los Angeles Cal.

Safety *in* Pipe Line Construction

(Continued from Page 23)

connected with blasting stumps is from improper crimping of the caps on the fuse. Men have been known to be so lacking in forethought as to crimp dynamite caps with their teeth. A man who is so thoughtless and has no more sense than to crimp a dynamite cap with his teeth, should be put in a padded cell so that if a cap should go off in his mouth he would be the only one to pay the price. Men have been known to crimp caps by by tapping with a hammer. Such men are not permitted on our jobs. Caps should be crimped with an approved dynamite cap crimper. We have been assured by the different powder companies that crimping dynamite caps with the proper crimper is safe. The way to eliminate this particular hazard is to use electric caps and a blasting machine instead of the old fuse and cap method.

Next in order of the work is stringing pipe. Of course, in order to string pipe economically as well as safely, it is essential to have good equipment; however, the first and most important factor is the man who sits behind the steering wheel. In stringing pipe, it is necessary to exercise a greater degree of skill than in ordinary truck driving, particularly so since in many instances it is necessary to travel over highways on which traffic is heavy and the hazards connected with a long coupled trailer on a truck are greater than on an ordinary truck.

Trucks and trailers are designed to carry definite loads safely and should not be loaded beyond this factor of safety. Loads should be properly boomed; our practice is to boom both at the front and rear bolsters. On loads the tops of which are flat, we boom on top of the load; but on loads the tops of which are round or cone shaped, we boom on the sides of the loads. When preparing to unload, our drivers are taught to release the boom standing on the ground and push the boom from them. By releasing the boom in this manner the possibility of an injury from the boom kicking forward with force is obviated.

In rolling the pipe from the truck the men should always stand behind the end of the joint and roll the pipe from them. The pipe should be dropped on the ground so that both ends will strike the ground at approximately the same time.

Following in logical order in welded pipe line construction is lining up the joints for welding. There is one hazard in lining up on which it is well to lay particular stress and that is the danger of mashing or amputation of fingers of the back end man when a joint is driven home. The back end man should be exceedingly careful not to attempt to remove dirt or other foreign bodies from the ends of the joints while the forward joint is being driven home. Many a finger has been left in the pipe and many a badly mashed hand has resulted from this practice. The men should also be exceedingly careful to stay out of the reach of the swinging tongs as the lining up tractor moves forward.

In actual acetylene welding where there is no gas in the pipe, about the only hazard that we have encountered is injury to the eyes of welders who for some reason or other were not wearing goggles. Such injuries, however, are exceedingly rare as all of our welders wear goggles almost constantly. Where acetylene is generated on the job, smoking should not be permitted near

Smoothtop's cooking ease brings bigger profits!

A size for every kitchen and every cooking need.

NEW LIFE IN GAS RANGE SALES!

The new Smoothtop will put new life in your gas range sales. It is the outstanding gas range specialty . . . the only gas range of its kind on the market. New, exclusive cooking features permit new easier, better cooking methods.

National advertising tells to the housewives of your city the story of the new Smoothtop's enclosed-top, 4-heat zone cooking that "Captures the Flavor ...Frees the Cook". In addition to local newspaper advertising helps, floor displays, window displays and cooking schools, you can have free training of your staff in up-to-date salesmanship.

No competition...once you've sold a prospect on Smoothtop's features she cannot shop around the corner and buy it elsewhere. And remember Smoothtop's longer specialty profit!

Write while dealership is open . . . to Standard Gas Equipment Corporation, 18 East 41st Street, New York City. Makers of . . . Smoothtop . . . Oriole . . . Acorn . . . Vulcan . . . the standard domestic and heavy-duty gas ranges wherever gas is used. Pacific Coast Distributor: Northwest Gas & Electric Equipment Co., Portland, San Francisco, Los Angeles.

Smoothtop

GAS RANGE

CAPTURES THE FLAVOR . . . FREES THE COOK

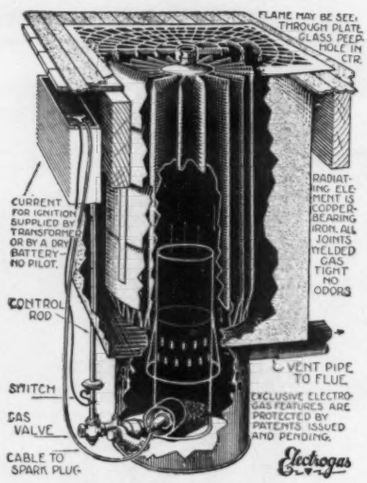
Electrogas

FLOOR FURNACES

The original electrically ignited furnace.

Hollow, streamlined fins offer unusual efficiency.

Fool-proof


FLAME MAY BE SEEN THROUGH PLATE GLASS PEEP HOLE IN CTR.
RADIATING ELEMENT IS COPPER-BEARING IRON. ALL JOINTS WELDED GAS TIGHT NO ODORS
CURRENT FOR IGNITION SUPPLIED BY TRANSFORMER OR BY A DRY BATTERY—NO PILOT.
CONTROL ROD
VENT PIPE TO FLUE
SWITCH
GAS VALVE
EXCLUSIVE ELECTRO-GAS FEATURES ARE PROTECTED BY PATENTS ISSUED AND PENDING.
CABLE TO SPARK PLUG
Electrogas

available in four sizes:
20,000 BTU
25,000 „
30,000 „
40,000 „
also in Cabinet type.

Electrogas, now in its tenth year, has won a reputation for efficiency, freedom from servicing, and all-around satisfaction which is second to none. It will pay you to handle this remarkable appliance.

ELECTROGAS FURNACE CO., Rialto Bldg., San Francisco

GAS BURNERS

For All Industrial Purposes

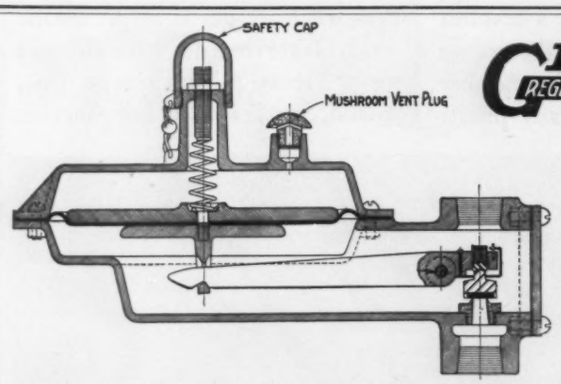
JOHN ZINK CO.

Oklahoma Natural Gas Bldg. Phone 4-9838

TULSA, OKLAHOMA

★

Flame Burners — Short Flame Burners — Flameless Burners



GROBLE REGULATORS & GOVERNORS

The Groble No. 1 Service Regulator with or without Dead Weight Safety Valve, made with ¾", 1" and 1¼" Inlet and Outlet Connections.

GROBLE GAS REGULATOR COMPANY, Anderson, Ind.

the generators, especially while draining and recharging. When welding on lines through which gas or oil has been passed there is a fire and explosive hazard which will be discussed later.

Probably one of the most dangerous operations in pipe line construction is testing for leaks while the pipe is in sections. The sections range from 100 feet to 300 feet, depending on the size of the pipe and topography of country through which the line is being laid. As mentioned previously, pressure is furnished by portable air compressors operated by gasoline engines. First, each end of the section is plugged with testing caps which are made by welding a circular plate to a center ring. Into this cap is welded a nipple through which the air is admitted. This cap is fastened to the end of the pipe with followers, and bolts. A 3/16-inch electrically welded chain is then placed over the end of the plug and twice around the pipe with a double claw hitch and the two ends of the chain are fastened together with a load binder. The required pressure is then put on the sections. As soon as the required pressure is reached, the stop cock is closed and the welds and seams tested. With the plugs secured as mentioned above, they should not slip or give with the pressure usually applied. However, all workmen should be cautioned not to stand in front of the plugs while pressure is on the sections. In fact, they should not be permitted in front of the plugs while pressure is on the sections. Sometimes the cap is very tight on the end of the pipe and it is difficult to remove, and it has been reported to me that some testing crews relieve the boom chain and allow the cap to blow off. This is a very dangerous practice and should not be tolerated. Testing is another operation in which the human element plays a large part in controlling accidents. It is work that requires constant supervision.

Painting or applying protective coatings presents very few hazards. The only trouble we have ever experienced was in warm weather when the painters' faces and hands would blister and the skin peel off. This trouble is not serious and can be prevented by using cold cream or vaseline on the face and gloves on the hands while handling the paint.

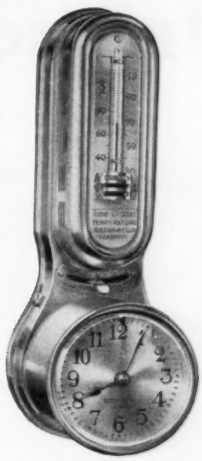
In handling a hot application there is the danger of burns from splashing and spilling the hot paint. To overcome this the crew, consisting usually of one man pouring, two men swabbing, and one man handling the pot, should wear boots, gloves, goggles and asbestos or oil cloth pants.

In ditching and excavating, as mentioned previously, about the only hazard in connection with ditching machines is the unguarded gears. We have not installed guards on our machines, as yet, but personally, I think it should be done and believe that it will be only a matter of time until it is. However, we have only had one lost time accident from this source in three years, and only seven days were lost from this one.

Unfortunately, however, not all the ditch can be cut with the machine. In creek and river crossings, in railway and highway crossings, and other deep cuts it is necessary to cut the ditch by hand. In hand ditching there are several hazards which should be given careful consideration. In all hand ditching, men should be spaced so that there will be no danger of injury from each others' tools. All ditches for creek crossings and cuts, where there is the slightest possibility of a cave-in, should be cribbed to prevent men from being injured from the ditch caving. It would be entirely out of question for me to say that all ditches beyond a certain depth should be cribbed. This should

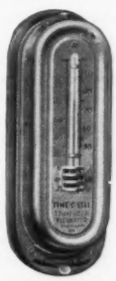
Why TIME-O-STAT'S

Snap-Action Thermostat IS IMPORTANT TO YOU!



The No. 500 Thermostat—An attractive, reliable, snap-action room Thermostat—with clock control.

BECAUSE of its snap-action blade, Time-O-Stat's Series No. 500 Thermostat makes and breaks circuits with a *decisive* action, preventing arcing and pitting of contact points caused by slow circuit breaking. The snap-action blade never sticks or drags or fails to make contact . . . This important Time-O-Stat feature helps you sell and saves you service costs . . . The Series No. 500 Thermostat maintains room temperature within a variation of 2° F. Its full jeweled Seth Thomas eight day clock provides dependable time control of temperature. It is available in two attractive finishes—chromium or statuary bronze.



The No. 502 Thermostat—Snap-action, reliable. For use where time control of temperature is not desired.

TIME-O-STAT CONTROLS COMPANY

ELKHART, INDIANA

Branch Offices and Exclusive Distributors in All Principal Cities of the United States.
Export Department: New York.
Canadian Distributors: Toronto and Montreal.

4270 Second Boulevard, Detroit, Mich. — Columbia 2570.
205 East 42nd Street, New York City—Vanderbilt 0134-0135.
400 West Madison Street, Chicago, Ill. — State 3725.
1430 Statler Building, Boston, Mass. — Liberty 2579.
202 Plaza Theatre Building, Kansas City, Mo. — Logan 4660.

TIME-O-STAT AUTOMATIC CONTROLS

Manufacturers of AUTOMATIC CONTROLS *for all types of Burners — Electric Refrigerators — Furnace Fans — Industrial Ovens — Ice Machines — Unit Heaters . . . also of Sign Flashers — Mercury Switches — Electric Heaters — Corrugated Metal Bellows.*

TIME-O-STAT CONTROLS COMPANY Dept. 6
Elkhart, Indiana

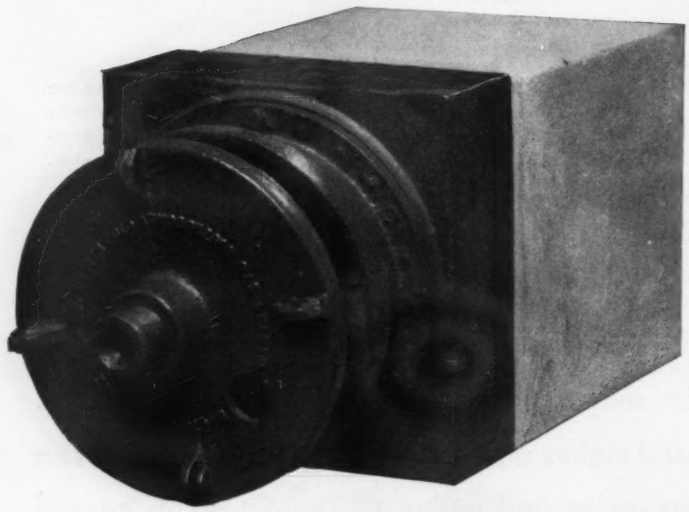
Send me, without obligation on my part, full details and descriptive literature.

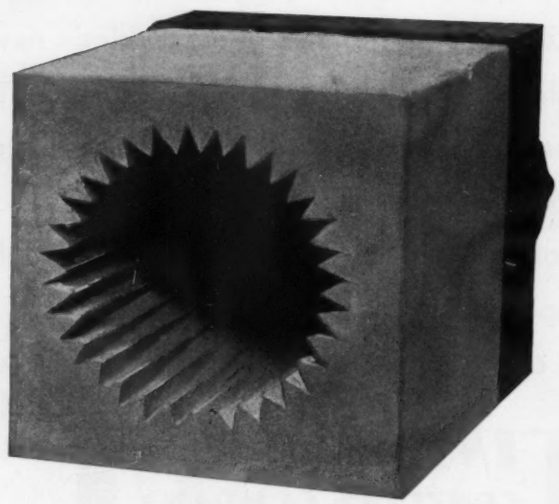
Name.....

Address.....

Company.....

Refractory where it meets the Heat





Write today for Bulletin 305

The *first* duty of the DFC Atmospheric Gas Burner is to create heat. It performs that duty with an efficiency which repeatedly is paying for the installation out of fuel savings within two to six months. The user gets positive, simplified flame control. He gets *a flame that won't blow out,* whether the gas pressure is 8 ounces or 35 or more pounds per square inch. The DFC burner presents a *refractory throat and nozzle* to high temperatures which would disintegrate ordinary equipment not protected by water cooling or other complicated systems. DFC burners are withstanding hundreds of hours at temperatures from 2,500° to 3,200° without sign of disintegration. Made in a wide range of sizes and capacities. Write for facts today.

The Denver Fire Clay Company

Denver, Colo., U. S. A.

Branches at Salt Lake City, El Paso and New York

be left to the judgment of the foreman, because any man that has had a good deal of experience in ditching and excavating work should be able to determine from the conditions prevailing at any particular location just when cribbing should be done. This, of course, requires close supervision and inspection.

In deep ditches it is also important to see that no large rocks, stumps, and other heavy bodies are permitted to remain where they would be likely to fall on men in the ditch.

Possibly the greatest hazard in connection with hand ditching is in blasting rock. The old method was to drill the holes, place the charges, light as many fuses as the powder "monkey" could light, and still have time to get in the clear before the first shot went off. Right here is where one of the hazards existed. The powder "monkey" did not always calculate his time correctly and the charges commenced to go off before he was in the clear. Then there was no way to determine whether all the charges had gone off except by counting, and occasionally a miscount was made, with disasterous results. One of our shooters went back to the ditch to investigate after he was supposed to have counted all the charges and just as he was about over the ditch a charge went off. He managed to pull through with his life but lost one eye. In another instance, a shooter lost both eyes because he deliberately disregarded all caution and went back to the ditch to light a fuse which he thought had gone out or had not been lighted, before the charges commenced going off. With the old hand firing method there was also the danger of some outsider or animal walking up about the time the charge was ready to go off.

There was also the danger of a charge which had failed to go off being exploded by contact with a workman's pick or the ditcher or rock excavating machine. With the modern method these hazards have been eliminated. All the charges go off simultaneously and the fire can be held until everybody is in the clear. With the aid of a small instrument known as a galvanometer, after the charge has been exploded any wire that is not entirely clear or in any way looks suspicious can be tested to determine if the charge failed to go off. If the instrument shows a circuit the charge has failed to go off and can be reconnected to the blasting machine and fired as in the beginning. I might add that during the nine months that we have been blasting by this method we have had very few instances where all the charges failed to go off at one time. I might also add that since we commenced using the machine method of blasting we have had no accidents from this source. In addition to being a safer method of blasting, we have found it to be more efficient and more economical than the old method.

With the fuse and cap method of blasting there is the hazard of crimping caps, as previously mentioned. Many men have lost their lives from improper crimping of caps and many children have lost their lives or were maimed for life as a result of playing with dynamite caps. With the new, or machine method of blasting, this hazard is eliminated, as the blasting caps are attached to the wire in the factory by skilled workmen.

We encounter our next hazard in laying and lowering the pipe in the ditch. If the equipment is suitable for the size pipe being handled and proper supervision is exercised, accidents from this operation should be practically negligible, but we do not always have this almost perfect combination. I think the greatest hazard from lowering-in is the

Actual size of this advertisement—3 column 10 inch.

Oven Heat Control FREE with Gas Range

Save $18 this week at the dealers

Until May 10..

modern Gas Ranges regularly selling for $118 *or more* and equipped with the automatic Oven Heat Control are "on special". You will receive the Oven Heat Control free. It is worth $18. That means you get the $118 range for $100.

Visit dealers now—Special Gas Range Exhibit!

One reason why the automatic Oven Heat Control is included this week is to encourage women to select the better and more beautiful ranges which give long years of excellent cooking. Another reason, is to induce women to enjoy the convenience afforded by the Oven Heat Control.

The Oven Heat Control automatically keeps the oven at any temperature. If your recipe calls for an oven of 375 degrees, you set the control at 375. Guess-work is eliminated—the cause of most baking failures. With the Oven Heat Control you never have to peep into the oven to see how the food is cooking. When the baking time is up, you just remove the food, perfectly done.

The ranges on special this week are modern in every respect. They have all the latest features, such as; the smooth top; rust-proof oven; broiler; enamel finishes in black and white, grey and white, and colors; etc.

As you have only a few shopping days left to take advantage of this special offer to obtain a fine, new range, we suggest that you see these Gas Ranges at the dealer's store very soon.

PACIFIC GAS AND ELECTRIC COMPANY

P·G·and·E·

Owned · Operated · Managed by Californians ·

Exclusively...**Dealer help**

The advertisement, reproduced above, was written for the sole purpose of helping the dealer during Gas Range Week.

All action has been directed towards the dealer. Even the Company signature cut is 1/3 the usual size.

This ad.—30 column inches—appeared once, during Gas Range Week, in each of the following newspapers:

City	Paper	City	Paper
San Francisco	Call-Bulletin	Berkeley	Gazette
San Francisco	Chronicle	San Jose	Mercury-Herald
San Francisco	Examiner	San Jose	News
San Francisco	News	Stockton	Independent
Oakland	Tribune	Stockton	Record
Oakland	Post-Enquirer	Sacramento	Bee

This schedule presents an example of the co-operation this Company is offering the dealer.

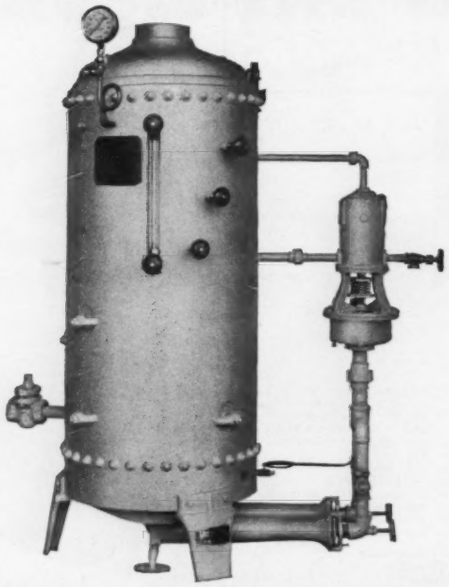
PACIFIC GAS AND ELECTRIC COMPANY

P·G·and·E·

Owned · Operated · Managed
by Californians ·

Automatic Gas Fired Boilers

LATTNER



All Sizes from ½ to 30 H. P.

P. M. LATTNER MANUFACTURING CO.

Factory
516 12th Avenue
Cedar Rapids, Iowa

Warehouse Distributor
2646 South Hill Street
Los Angeles, California

The BARTLETT HAYWARD CO.

Designers and Builders

GAS HOLDERS

COMPLETE COAL GAS, CARBURETTED WATER AND BY-PRODUCT PLANTS
SALT WATER and FRESH WATER CONDENSERS
PURIFIERS, STEEL TANKS, FELD VERTICAL SCRUBBERS

Main Office and Works
Baltimore, Md.

Lincoln Building
New York City

IMUNOL

failure to provide sufficient safety skids for protection of men who are required to get under the pipe to retouch the painting or protective coating, to clean out caved ditches, to make bell hole or connecting walls, etc., before the pipe is lowered. There should be not only a sufficient number of safety skids under the pipe but they should also be made of timber that is not easily broken. These skids should be made of oak or other extremely tough wood, as pine and other soft or semi-soft woods will not stand the sudden strain to which the skids are subjected, especially when handling large diameter pipe. We have had instances where one skid would suddenly break and all other skids for several hundred feet would snap, one after the other. Proper material and constant supervision should eliminate this hazard. The remainder of the job, backfilling and cleaning up, presents no hazards of any consequence.

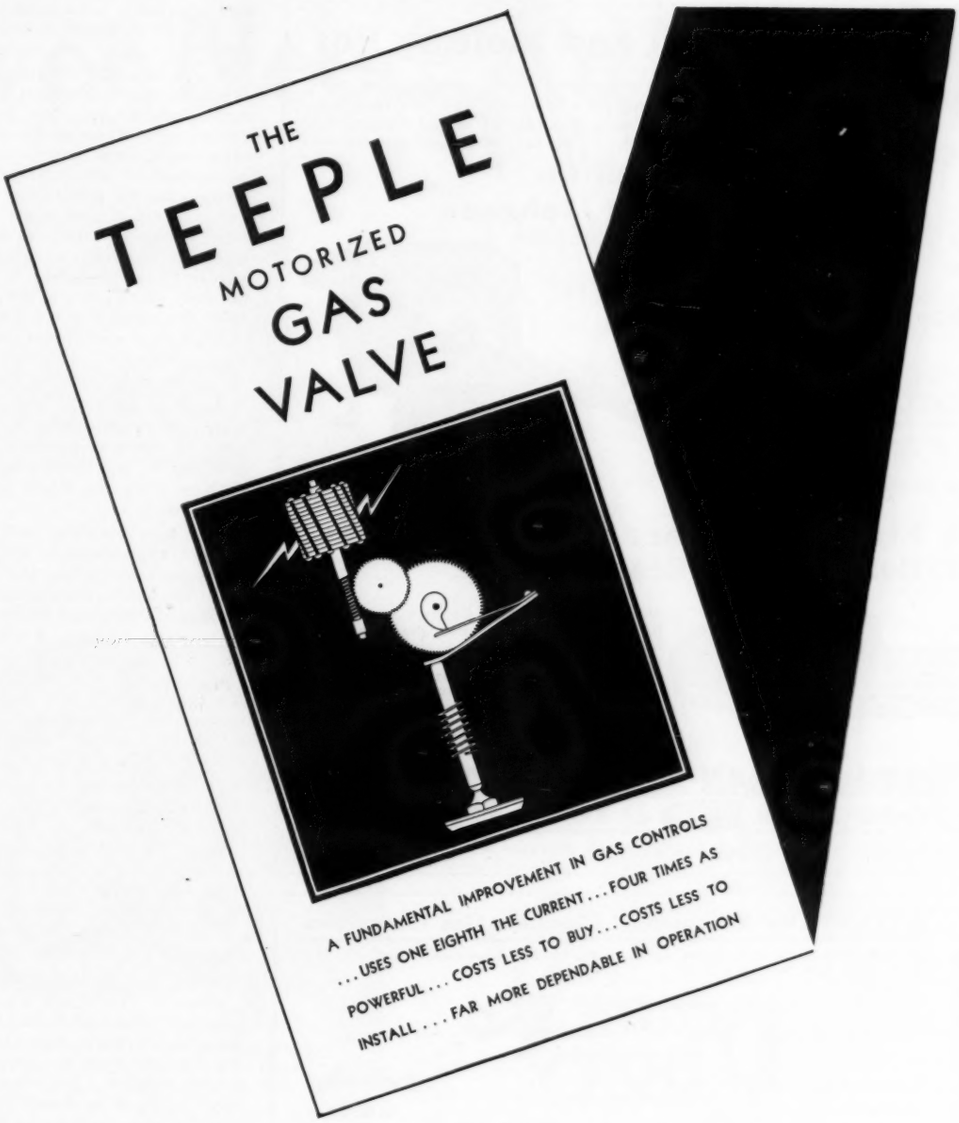
In connection with the subject of hazards in pipe line construction, I do not believe it amiss to discuss briefly some of the hazards in making pipe line repairs. My company, in years past, had had some severe accidents while making repairs to main lines. In one instance, one man lost his life and another sustained severe injuries, while in others we have had men injured more or less seriously. When making repairs to a line through which gas or oil has passed there is the ever present hazard from fire and explosion. This is especially true when it is necessary to replace a joint or section of pipe. The greatest problem we have had to solve was the best method to combat this hazard.

In the old days before the development of modern methods and tools for cutting out a joint or a portion of joint, the cut was made with pipe rippers and sledge hammers. Cutting pipe by this method was not only a slow and laborious task but it also presents two hazards—the danger of a spark from the blow of the hammer on the cutter igniting the gas vapors, and the danger of a chip of metal striking a man in the eye.

One of the engineers recently developed an improved portable cutter for cutting large diameter pipe in the field. This apparatus has four cutters. It is collapsible and is set up on the end of the joint of the section to be cut and two men can make a cut through 20-inch pipe in 15 minutes after it has been placed on the pipe and adjusted. Placing on the pipe and adjusting requires less than 30 minutes, so that less than an hour is required for the complete operation. With this cutter it is not necessary to wait until the line has been completely drained to make the cut, and also it eliminates the two hazards mentioned above.

In making repairs to a line under pressure, in addition to the fire and explosive hazard and the danger of flying pieces of steel, there is also the danger of injury to the eyes from blowing of sand and gravel. We have had several injuries from this source, one of which was quite serious. About the only safeguard I can suggest against this hazard is to wear goggles, and as far as possible to keep out of the path of the escaping gas.

I believe my discussion would be incomplete without mention of one other hazard in connection with repairs to gas lines. That danger is failure to completely purge the line of air before putting it back into service. There is no definite formula for determining just when the line is completely purged, but a foreman experienced in pipe line operation will usually be able to determine from the size and length of line just how long it should be blown. Failure to thoroughly purge the line of air can re-



Big Things Often Come in Little Packages

Here, for example, is a little folder about a big development in automatic gas heating. It's the *how* and *why* story of the Teeple Motorized Gas Valve. A copy of it is ready for every person in the industry who wants to know about and profit by a gas valve that has twelve distinct superiorities over the ordinary gas valve. Clip and mail the coupon below for your copy. L. R. Teeple Company, 540 East Ninth St., Portland, Ore.

TEEPLE

L. R. Teeple Co.,
540 E. 9th St. Portland, Oregon

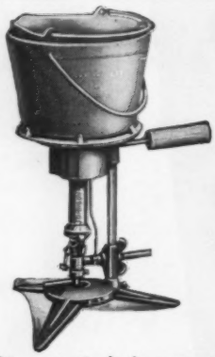
Please send me a folder on the Teeple Motorized Gas Valve.

Name _____

Company _____

Street Address _____

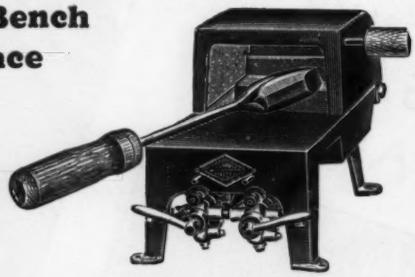
City _____ State _____ W6



No. 8 Torch and Melting Pot

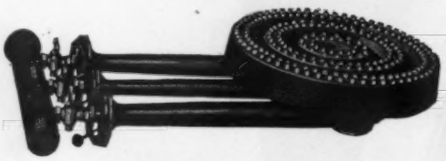
A practical and inexpensive unit easily adapted to perform a number of heating jobs in shops and laboratories. The burner is adjustable to any angle or may be removed and used as a hand torch. The No. 8 operates without a blower. Write for details.

The All-Round Johnson No. 101 Bench Furnace



This practical furnace is unequalled for heating soldering coppers, heat-treating, tempering, annealing or case hardening. The No. 101 is a fast, efficient worker. Two powerful burners produce a heat of 1600 to 1800 degrees F. without a forced air blast.
Write for catalog giving full details and prices.

Johnson Ring Burners are Built to Perform Efficiently and Economically



Johnson 60BCE Ring Burners are known for their efficiency and dependability. These burners embody a number of exclusive construction features which produce a higher flame temperature and more perfect combustion resulting in greater efficiency. Let us send you our catalog which describes the entire line of Johnson Gas Appliances.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative: C. B. Babcock Co., 135 Bluxome Street, San Francisco

ATTENTION! Commercial Members Gas Companies

A Spic and Span gas stove is a credit to the house-wife and can be kept that way by the use of

Removes Grease

DOUBLE DUTY
REG. U.S. PAT. OFF.

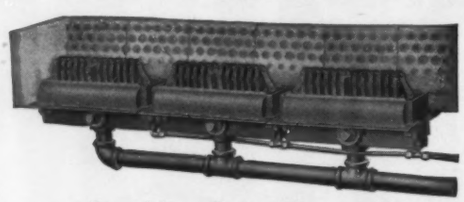
Prevents Rust

GAS RANGE & STOVE CLEANSER

WALMAR LABORATORY Oshkosh, Wisconsin

Western Distributor
C. B. BABCOCK CO., San Francisco, Los Angeles

R. M. C. Gas Burner



Durable Safe Economical

ROTARY MANUFACTURING CO.

5720 Long Beach Avenue Los Angeles, California

sult in serious consequences to the workmen as well as to the consumers affected by the shut off.

It will be noted that throughout this paper I have stressed the part played by the human element and the importance of the proper supervision of the work. Mechanical safeguards alone can prevent only a small percentage of all accidents. The vast majority can be prevented only through organized effort to reach every executive, superintendent, foreman, and workman, and to secure the full cooperation of every individual from the president of the concern to the men on the firing line. To this end we must concentrate our efforts.

SKYSCRAPER TO BE BUILT FOR HENRY L. DOHERTY INTERESTS

Announcement is made from the New York offices of Henry L. Doherty & Company of the construction of a 63-story office building in the downtown financial district of New York, on Pearl street between Pine and Cedar.

The new building will be erected at a cost of approximately $15,000,000 and will be connected with the present 26-story Doherty headquarters building, located at 60 Wall Street, by a bridge at the 16th floor.

Henry L. Doherty & Company and Cities Service Company will occupy the first 19 floors of the new building. A tower 30 stories in height will be constructed at the top of the building, with the top floors of this tower being reserved for the private offices of Mr. Doherty.

Double deck elevators which take on and discharge passengers at two floors simultaneously, will serve the building.

It is planned for the west section of the skyscraper to be completed by May, 1931. The east section will be completed by May, 1932.

"ARISTOCRATS OF THE FIREPLACE" SUBJECT OF BROCHURE

General Gas Light Company with headquarters offices at Kalamazoo, Mich., manufacturer of Humphrey Radiantfire heaters, has brought from the press a profusely illustrated booklet, "Aristocrats of the Fireplace." It is published chiefly for distribution by gas utilities to interior decorators, architects and builders, and describes the company's line of fireplace heaters, featuring the various models which have been designed to harmonize with period furniture.

UNITED GAS BUYS TEXAS PROPERTY FROM MORAN

United Gas Company has purchased the gas system of the Moran Gas Corporation, transporting gas from the White Point field in San Patrico County, Texas, to Taft, Gregory, Portland, Aransas Pass and Ingleside, where it maintains distribution systems. The purchase price was understood to exceed $1,000,000.

The refinery and ocean loading terminal of the Humble Oil & Refinery Company at Ingleside is supplied by the system. Approximately 4,500,000 cubic feet of gas a day is delivered to its combined domestic and industrial consumers.

MERCO-NORDSTROM OPENS OFFICE AT ST. LOUIS, MO.

An office has been opened in St. Louis, Mo. by Merco Nordstrom Valve Company for the purpose of serving the trade in that territory. It is under the management of Leonard J. Kanard and is located at 317 North 11th Street.

Never Need Adjustment!

No. 610 Eureka—10 flames; height, 24½"; width, 38"; depth 13". Finished in Ebony Bronze, Old Iron, Oxidized Brass, Statuary Bronze, Natural Bronze or Antique Brushed Brass.

No. 810 Aztec—10 flames; height, 24"; width, 33"; depth, 11½". Finished in Antique Brushed Brass, Oxidized Brass or Statuary Bronze.

Many Handsome Models

The illustrations above show two of the many models of Pacific Radiant Heaters. There is a style and finish to suit every purse and every taste.

A. G. A. Approval

Every Pacific New Feature Radiant Heater carries the famous Blue Star, signifying the approval of the American Gas Association from the standpoints of basic national safety requirements.

Trouble-Proof Pacific Burners Please Customers and Profit You

WHY SELL a radiant gas heater that must be adjusted (perhaps inaccurately) by the man who installs it? Any time later, for various reasons, it may get out of adjustment and cause a smoky, smelly flame.

The Pacific New Feature Burner has **no adjustable air mixers.** It is scientifically constructed **at the factory** to inject the correct amount of air. It never gets out of adjustment, always burns with an intense blue flame, is odorless, noiseless, and safe.

Pacific radiant fireplace heaters completely satisfy your customers, save you costly servicing, and carry the **good profit** of a quality line.

Note These Features

1. No adjustments to make on burners.
2. Burners instantly removable for cleaning — just lift out.
3. Operates perfectly on varying gas pressure.
4. So simple, efficient, and accurately constructed that service adjustments are practically eliminated.
5. Installation is cheaper and easier because it requires only a gas connection and no burner adjustment.

Write for Valuable Agency Proposal

We make an interesting and worth-while offer to any well established firm that is interested in selling more and better gas-heating appliances. Write today for full details of attractive dealer proposition.

Pacific Gas Radiator

Gas Heating **Company** *Headquarters*

Roseberry and Walter Sts., Huntington Park, Calif.

MANUFACTURERS OF EVERY TYPE OF GAS HEATING APPLIANCE

The New Enamel Cleaner!

A-B Vit

For Stubborn Stains

▫ ▫ ▫

This unusual product is finding increasing favor not only as a cleaner for porcelain gas ranges, but also for sinks, bath tubs, and all enamel ware . . .

A profitable side line. Two sizes —to retail at 25c and 50c.

Write for details Today –

▫ ▫ ▫

A-B Stove Co.

Battle Creek Michigan

FORNEY

COMBINATION GAS and OIL BURNERS

For Power Plant and Industrial Uses

Write for Literature
and List of Installations

FORNEY COMBUSTION ENGINEERING CO.

305 THOMAS BLDG., DALLAS, TEXAS

INGERSOLL-RAND CO. INTRODUCES 2000-LB. UTILITY HOIST

INGERSOLL-RAND Company, 11 Broadway, New York City, has introduced a new-sized "utility" portable air hoist of 2000-pound capacity.

"Utility" hoists, in capacities up to 1500 pounds, have been used by miners and contractors for the past three years. The addition of the 2000-pound size makes this type of hoist available for additional classes of work.

The hoist employs a radial, four-cylinder, counterbalanced, reciprocating-piston type

air motor, which is reversible. All wearing parts and cylinders are renewable, and the cylinders are also interchangeable.

The reduction gears between the motor and drum are all machine-generated spur gears cut from selected materials and are heat-treated. The gears are completely enclosed in a housing, this feature designed to exclude dust and permit the gears to operate in a bath of semi-fluid grease.

Ball and roller bearings are used. The bronze throttle valve is tapered and is fitted into a bronze bushing.

A clutch of the positive-jaw type is used to disengage the motor. This clutch is thrown out by an eccentric shaft controlled by the clutch lever. This lever is located on the top of the hoist and automatically locks to hold the clutch either engaged or disengaged.

A brake of the bank type wraps the drum at its largest diameter. The operating lever for the brake may be adjusted to six operating positions.

The motor is enclosed in a dust and dirt proof case.

COLLIE B. WILSON GOES TO ARK. NAT. GAS CORP.

Collie B. Wilson has been transferred from the industrial engineering department of the Joplin Gas Company to the Arkansas Natural Gas Corporation at Shreveport, where he will be associated with the New Business Department. He has been a member of the Doherty organization since 1924 and is a graduate of Georgia "Tech," class of 1921. Floyd J. Tucker, New Business representative of the Kansas City Gas Company, succeeds Mr. Wilson at Joplin.

JONESBORO WELCOMES NATURAL GAS WITH GALA AFFAIR

The Chamber of Commerce of Jonesboro, Arkansas, tendered a banquet in honor of the Arkansas Power & Light Company in April, when natural gas service was begun in that town. The banquet was followed by a street dance, in which about 3,000 participated. W. A. Green is manager of the Arkansas Power & Light Co., at Jonesboro.

Two newspapers published special editions honoring the advent of natural gas.

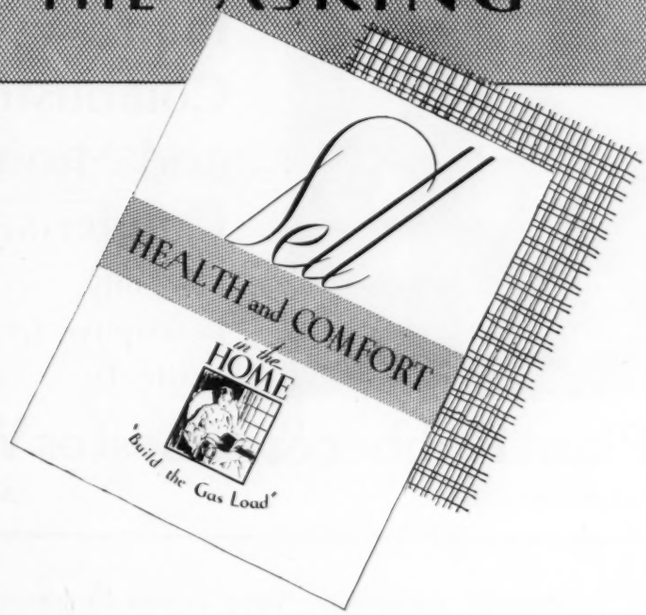
Sell GAS

THIS COMPLETE SALES MANUAL YOURS FOR THE ASKING

NOW is the time to lay your plans for building the gas load next fall and winter. And the logical means of building the gas load in your territory is through home heating by gas. This large potential market lies before you almost completely untapped. It is merely awaiting your exploitation.

To help you develop this rich market, we have prepared a complete sales manual for your use, in which we explain how other gas companies are building the gas load through home heating. Also this manual shows how we are prepared to guide you and aid you in your merchandising plans.

Whether or not you have a home heating department at the present time, you should have a copy of this manual for reference. Gladly will we send you a copy without the slightest obligation. Merely write in on your letterhead and ask for our new book entitled, "SELL HEALTH AND COMFORT."



Southern and Western Representatives

A. S. Kincaid, 2538 South Ervay St., Dallas, Texas
S. C. Bratton, American Traders Bank Bldg., Birmingham, Ala.
R. L. Smith, Tulsa Hotel, Tulsa, Okla.
Thomas A. Williams, 400 Scott Bldg., Salt Lake City, Utah

ROBERTS
CONTROLLED
GAS HEATING UNIT

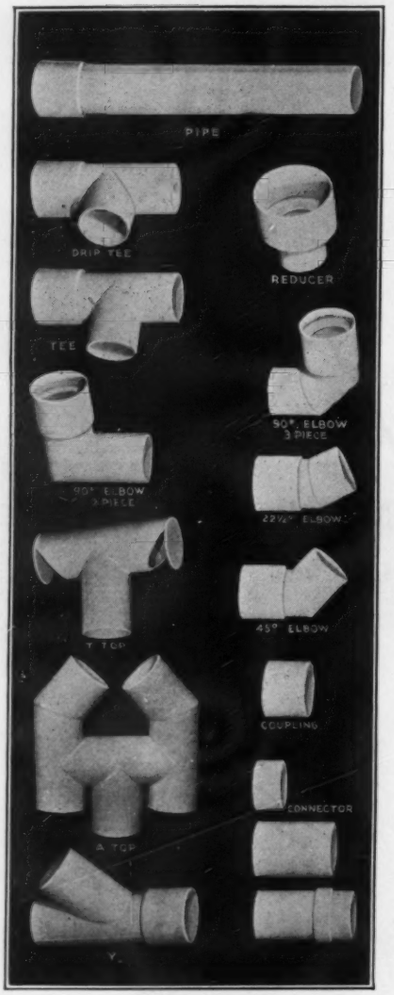
ROBERTS-GORDON APPLIANCE CORPORATION

DELAWARE AVENUE AT TUPPER STREET

CURTISS BUILDING **BUFFALO, N. Y.**

TRADE MARK

VITEX



The Light, Durable and Non-Corrosive Gas Vent and Flue Pipe— is easy to Install— Increases Draft, Improves Combustion, and Minimizes Condensation

For Fully Descriptive Catalogue Write To

Plant Rubber & Asbestos Works

537 Brannan Street San Francisco

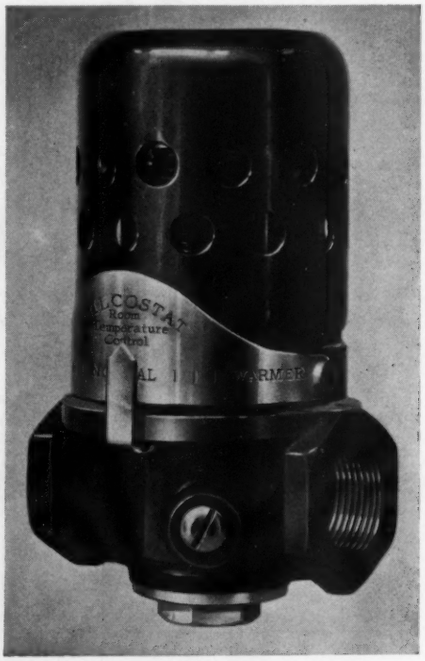
Natural gas in a territory means thousands of furnace conversion jobs. A large percentage of these homes can be sold radiant fires for the fire place at the same time. Once the drudgery of coal and wood has been banished from the basement, it can easily be talked out of the living room fire place.

C. B. BABCOCK CO.

San Francisco Los Angeles

WILCOSTAT TEMPERATURE CONTROL ON MARKET

AN automatic room temperature control for gas-fired circulators, called The Wilcostat, has been developed and is being supplied to manufacturers and distributors of circulators by The Wilcolator Company, of Newark, N. J., manufacturer of temperature controls for household appliances.



This device maintains room temperature within one degree of the temperature desired, and can be installed on all standard makes of circulators at the factory or while actually in service.

The design of the unit is rugged, although it is small, and is finished to blend with the circulators to which it will be attached.

A folder on the Wilcostat is available to those interested.

COMMERCIAL GAS CO. WANTS TO EXERCISE FRANCHISE RIGHTS

Commercial Gas Company, Ltd., has applied to the California Railroad Commission for a certificate authorizing the company to exercise franchise rights for the distribution of liquefied petroleum gas in Lancaster and several other towns in that vicinity. The company has a franchise from the Los Angeles County Supervisors covering four townships, of which the largest are Lancaster and Palmdale.

James E. Langston is president of the company, and has been engaged in an eight-months survey of the field. Plans include the transporting of the fuel to the central plant in tanks, and the construction of pipelines to serve the various towns.

The company now has before the Railroad Commission an application to sell 1,320 shares of common capital stock at $25 per share to finance the project.

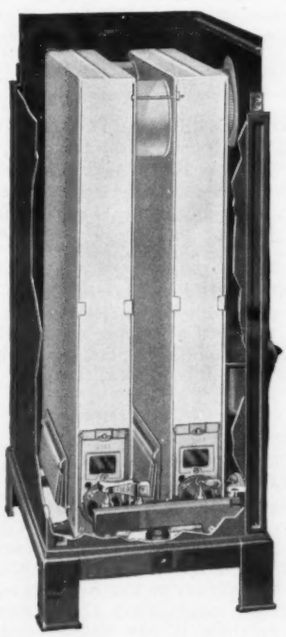
ARKANSAS NATURAL TO HOLD FIRST AID CONTESTS

A team of seven men, representatives of the Munce station, the Magenta plant and Richland field, of the Arkansas Natural Gas Corporation will represent Arknatco units in competition first aid drills and inter-company contests to be held in the early fall.

Gas Heat

Is Far Easier to Sell When You Sell

MOORE'S GAS HEATERS



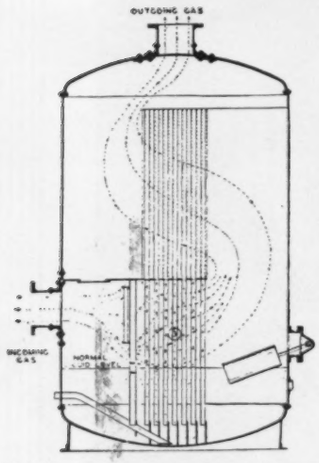
Multiple Units Make Greater Efficiency.

All Controls Are Concealed and Safe.

Get
SAFE
EFFICIENT
ECONOMICAL
ODORLESS
CLEAN
EFFORTLESS
GAS HEAT

MOORE BROTHERS COMPANY
Cooking and Heating Appliances
JOLIET Since 1857 ILLINOIS

DRY GAS



THE term *dry gas* has taken on a new meaning since the Campbell MIST-D-FIER scrubber has been introduced.

Since the MIST-D-FIER takes ALL the oil-mist and ALL the water mist out of the gas lines, figure what this means.

It means a greatly improved quality of gas passed on to the consumer, plus the customer good-will secured thereby. It means money saved in drip-tending and money saved in meter-servicing.

In a word, the MIST-D-FIER means satisfaction both to the producer and the consumer.

For full particulars, write for Bulletin No. 6

J. A. CAMPBELL CO.
Natural Gas Engineers
CONSULTING DESIGNING CONSTRUCTING
PHONE-41693
P.O.DRAWER 669
LONG BEACH, CAL.

STEARNS-ROGER MFG. CO., DENVER
MID-CONTINENT AGENCY

Stage set-up used in Municipal Gas Company's cooking school at Ennis, Texas. From left to right: Miss Lavenia Overhiser, school hostess, John H. Duke, manager for the company, and Arthur Healey, salesman

Municipal Gas Co. Conducts 11 Cooking Schools

THE Municipal Gas Company of Dallas, Texas, affiliated with the Lone Star Gas Company, conducted a series of cooking schools during the spring and fall of 1929 that drew a total attendance of 17,339.

The schools were conducted in 11 towns served by the Municipal, five communities being hosts to the school during the spring months and six during November and December.

Each school was conducted over a three-day period and was staged under the direction of the Commercial Department of the Municipal, and under the auspices of the local plant in each town. John L. White is commercial manager for the company.

Mrs. Luella M. Fisher, home service demonstrator, associated with the Eriez Stove Company, actively supervised the schools and gave cooking demonstrations and lectures at each session.

Several of the towns in which the schools were conducted are college centers. In each instance where this was true, the domestic science department of the college turned out in a body to attend the lectures. High schools also took advantage of the demonstrations through having some of their classes attend.

In each town where the school was given, liberal newspaper space was used to advertise the demonstration. A printed invitation was also presented to every housewife in the town. Delivery of this invitation was made by uniformed Western Union boys.

Free prizes were given each day, with a grand prize being awarded at the close of each school.

An unusual opportunity was afforded in each town for employees of the company to get better acquainted with the housewives of the city. The position of hostess for the school was filled by women employees of the local plants, and opportunity was also given for other employees to become better acquainted with the consumers.

The towns in which the schools were conducted were Corsicana (spring and fall schools), Denison, Cleburne, Hillsboro, Waxahachie, Ennis, Sherman, McKinney, Denton and Bowie.

JOHN H. PAPE DIES SUDDENLY AT BERKELEY, MAY 4

As a shock to his many friends and working associates, came the news of the sudden death of John H. Pape, local manager of the Pacific Gas and Electric Company at Berkeley, and pioneer resident of that city.

Mr. Pape, apparently in the best of health, succumbed to an unexpected heart attack while reading in his home on the evening of May 4.

Coming to Berkeley from New York State 59 years ago, Mr. Pape had occupied various positions with the Berkeley Municipal light plant and the Oakland Gas and Light Co., which were later merged with the P. G. and E. Co.

STAMFORD & WESTERN GAS CO. SOLD FOR $2,500,000

Stamford & Western Gas Company, recently purchased by Lone Star Gas Corporation, was bought at a price of $2,500,000. Under the new ownership the pipe line system will be operated by Lone Star Gas Company, and the distribution systems by the Community Natural Gas Company.

STOCKTON FIREBRICK TO HAVE NEW $500,000 PLANT

At a cost of $500,000, a new plant will be erected in the near future by the Stockton Firebrick Company. The exact location of the plant has not yet been decided upon, but it will be in northern California.

This new plant will be devoted to the production of firebrick and refractories. It will be equipped with a tunnel kiln, with a capacity for 1,000,000 bricks per month. The present plant will continue operations as before, but largely for the development of new products.

D. H. TUCKER NOW VICE-PRES. OF TEXAS GAS UTILITIES

D. H. Tucker has recently resigned as chief engineer of the Texas Cities Gas Company to become vice-president and general manager of the Texas Gas Utilities Company with headquarters at Del Rio, Texas.

This company, a subsidiary of the Appalachian Corporation, is now constructing a 10-inch gas line from the Maverick County gas field to Del Rio, and nearby cities.

. . . . the unfailing boss of your gas heating plant"

If the gas company is going to heat your home, you will find a remarkable little instrument placed on the living room wall.

It never seems to do a stroke of work, but it saves you endless hours of labor and keeps you warm and comfortable. It does not ask for wages, but it does a job a dozen janitors could not do—it prevents many colds, protects your home from overheating, and reduces your bills for fuel.

Quiet, unobtrusive, demanding only a weekly winding, this amazing electric janitor takes complete charge of your gas heating plant. It is the brain, the nerve centre of the heating system.

The Minneapolis-Honeywell Heat Regulator is what makes your system automatic. It keeps the room temperature uniform. It lowers the temperature when you go to bed and raises it again before you get up. It prevents wasteful and dangerous overheating of the home. In gas and oil systems it regulates the supply and ignition of fuel and safeguards the system.

After all, what could be more important when selecting an automatic heating system than the *automatic* part of it?

To men in the heating industry, automatic heat control means Minneapolis-Honeywell. Our engineers have worked in the closest cooperation with the makers of gas heaters, oil burners, automatic coal stokers and heating plants, developing the special automatic controls needed by each.

When you buy any kind of automatic heating system, the price you pay includes the cost of good dependable controls. Make certain you get the best. Insist on Minneapolis-Honeywell Automatic Heat Controls, the controls installed as standard equipment on the leading makes of automatic heating systems. Meanwhile, write for free booklet, "The High Cost of Overheating."

MINNEAPOLIS-HONEYWELL REGULATOR CO., (Also manufacturers of industrial temperature, pressure and combustion safety controllers, industrial motor valves, automatic control for unit heaters, and Jewell Temperature Regulators.) Executive Offices: 2720 Fourth Avenue So., Minneapolis. Canadian Office: Minneapolis-Honeywell Regulator Co., Ltd., 123 York St., Toronto, Ont., Canada. Branch offices and distributors in principal cities. Authorized factory-trained representatives in almost every city.

MINNEAPOLIS HONEYWELL
HEAT REGULATOR

THOUSANDS

of future gas heating customers read this advertisement

The Saturday Evening Post and Collier's, with a total circulation of more than 5,000,000, carry this story that stops every gas heating prospect.

This advertisement and the others to come tell your prospects about the importance of good controls for automatic gas heating. They influence your prospects to consider most favorably the installation of Minneapolis-Honeywell controls.

Are you using this extra assistance in closing more sales? Make Minneapolis-Honeywell gas heating advertisements a definite part of *your* selling story.
Minneapolis-Honeywell Regulator Co.

Executive Offices
401 E. 28th St., Minneapolis, Minn.

California Branch
557 Market St., San Francisco, Calif.

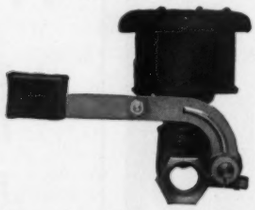
Distributors
Portland, Seattle, Salt Lake City, Denver

Gas Burning! RESULTS

Ventite Inspirating Burners — 6 sizes for intermediate and high pressure gas.

Motor Driven Control Valves 6 sizes—125 lbs. W.P.

Industrial Heating Equipment



Magnetic Shut-Off Valves 6 sizes—125 lbs. W.P.

Send for Booklet of Results—Not a Catalog

Pacific Coast Representative

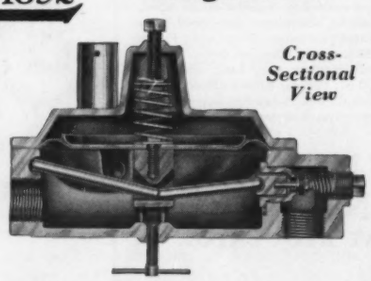
The T. G. ARROWSMITH CO.
661 Howard St.
San Francisco, Calif.

MAXON PREMIX BURNER CO.
INDUSTRIAL FUEL BURNING EQUIPMENT — FOR OIL OR GAS, OR BOTH COMBINED
MUNCIE MAXON PREMIX BURNER INDIANA

Reynolds Gas Control Since 1892

Reynolds Little Giant Regulator

Products for all kinds of Pressure Reduction—for either artificial or natural gas.
GOVERNORS—Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street.
REGULATORS—High Pressure Service, Low Pressure Service, High Pressure Line, Single and Double District Station.
VALVE—Automatic Quick Closing Anti Vacuum.



Cross-Sectional View

Reynolds Gas Regulator Company
Anderson, Indiana

"COAST COUNTIES CONTACT" MAKES BOW IN HOUSE ORGAN FIELD

THE "Coast Counties Contact" is the most recent utility house organ to put in appearance on the Pacific Coast. It is published in mimeograph form, letter-head size, and is issued every week by the News Bureau of Coast Counties. It is in great demand every Monday morning among all the employees throughout Coast Counties service area in northern California.

Contributions are sent in from all districts each week, and the paper consists of an informal discussion of employee activities, humorous anecdotes concerning members of the organization, and messages from executives and department heads.

Inter-district baseball has been one of the most important features of employee activities during the past few months in the Coast Counties territory, and the new company magazine has done a great deal to foster the good fellowship and friendly rivalry between districts.

The name "Contact" was selected from names submitted by employees during a contest and signifies contact between employees, between districts and departments, as well as between employee and consumer.

"HEAT—AS YOU LIKE IT—WITH GAS," WINS SLOGAN CONTEST

In a slogan contest recently staged by the Gas Service Company among its employees, approximately 900 slogans setting forth the advantages of heating with gas were turned in.

The winning slogan was: "Heat—As You Like It—With Gas," submitted by Thomas B. O'Connor, general office.

Judges of the contest were F. M. Rosenkrans, new business manager of the company; Ray T. Ratliff, advertising manager, Kansas City Gas Company, and Bill Holland, manager of the Holland Engraving Company, Kansas City.

STANDARD GAS EQUIPMENT CORP. ADS. FEATURE GAS SUPERIORITY

Standard Gas Equipment Corporation of New York City has prepared a campaign featuring the advantages of gas as a cooking fuel. The campaign is planned with the central idea of placing gas appliance advertising on the offensive rather than the defensive in the domestic fuel market. Two slogans are being used: "Save 15 minutes every time you cook with gas" and "No other fuel will cook with the speed of gas."

A six-page brochure has been printed announcing the campaign, giving examples of the type of advertising to be employed, and each one featuring the central theme—the saving of time through the use of gas as a fuel.

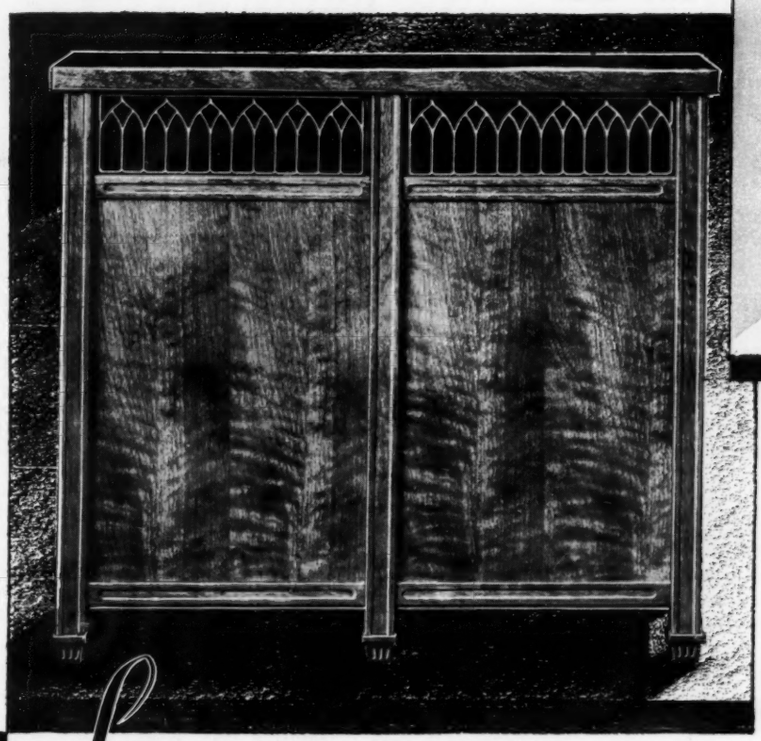
WESTERN COUNTIES NOW CENTRAL STATES P. & L. CORP.

The name of the Western Counties Gas Company of Oklahoma City, Okla., has been changed to the Central States Power & Light Corporation. Sale of the Western Counties Gas Company, with holdings in 12 southwestern Oklahoma towns, to the Central States corporation was announced early last December. Towns affected by the change in company name are: Cordell, Hobart, Clinton, Bessie, Sentinel, Rocky, Port, Dill, and Lone Wolf.

KREBS GRANTS NATURAL GAS FRANCHISE TO SKOW

Krebs, Okla., has voted a natural gas franchise to G. W. Skow and associates of McAlester, Oklahoma.

TUNE IN WARMTH!



In modern homes and offices, there's always a place for a useful, good looking piece of furniture!

Payne

Looks LIKE A RADIO

But this Beautiful Console "Brings in" Balmy Heat!

One reason why most people postpone the purchase of home and office heating equipment until Winter is well along, is that ordinary old-style gas heaters are awkward and ugly, besides taking up much needed space.

The New Payne Console has changed all that! Here is a warm air circulating, cabinet-type heater of extraordinary beauty... and practical *all-season* utility as well!

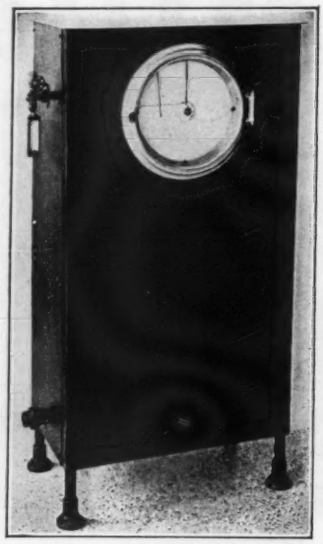
Outwardly, the new Payne Console resembles a high-grade radio. It fits close to the wall, occupying no more space than a sectional bookcase. It heats every nook and corner, yet top and sides remain cool to the touch *always*...no more scorched walls or rugs...no burned fingers for tiny tots at play! Vent carries off burned fumes. Recirculates warm air without causing cold drafts on floor!

The smooth, flat top of the Payne Console affords an ideal spot for book ends, table lamp, flower bowl or bric-a-brac, yet fresh, pure warmth is available instantly...merely by turning on a valve!

There is still time to order your Summer and Fall requirements. Literature giving complete information and prices, will be sent to you, gladly.

PAYNE *Console* HEATER

MANUFACTURED ONLY BY THE PAYNE FURNACE & SUPPLY CO., INC., BEVERLY HILLS CALIFORNIA



Improved Recording Gravitometer for Gas

—is sensitive to all changes of specific gravity, giving an accurate record which insures the correct measurement of Gas.

—has a short time lag between change of gravity in pipe line and change of record on the chart.

—requires a comparatively small quantity of sample gas passing through the instrument and the record is continuous.

—is indispensable where the specific gravity of gas is fluctuating.

Write for Details

The Refinery Supply Co.

621 E. Fourth Street Tulsa, Okla.
Branch: 3404 Main St., Dallas, Tex.
Pacific Coast Representative:
The Braun Corporation
363 New High St. Los Angeles, Calif.

The First Substantial Improvement in Storage Water Heaters

THE heater is finished in lustrous enamel.

300-lb. test copper-bearing Steel tank.

New Efficient Insulating Material.

Safety Pilot.

Combination Safety and drain valve.

2 sizes: 25 gal.—40 gal.

Pittsburg Monarch Superfine Automatic Storage Water Heater

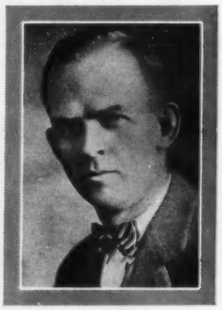
Made in 2 Sizes
25 Gallons—40 Gallons

Pittsburg Water Heater Company

Offices at:

478 Sutter St. San Francisco
2010 Jackson St. Dallas
242 So. Western Ave. Los Angeles

CARL T. McKELVY SALES MGR. FOR TIM-O-STAT CONTROLS



Carl T. McKelvy

TIME-O-STAT Controls Company, manufacturer of automatic controls, of Elkhart, Indiana, has announced the appointment of Carl T. McKelvy as sales manager.

Mr. McKelvy comes to his new position with the Time-O-Stat company from a background of sales experience. He was recently associated with Brunswick-Balke-Collender Company.

HENRY L. DOHERTY GETS WALTON CLARK SCIENCE MEDAL

"In consideration of his outstanding and valuable work in the development of the manufactured gas industry," Henry L. Doherty has been awarded the Walton Clark Medal by the Franklin Institute, established in 1824, and said to be the largest institution in the United States devoted to the study of applied science and mechanic arts.

One side of the medal bears the inscription: "Awarded by the Franklin Institute to Henry Latham Doherty for original and notable work in the gas industry."

AUTOMATIC BOILER FEED IS FEATURED IN NEW CATALOG

Mears-Kane-Ofeldt, Inc., has recently brought from the press Catalog Unit No. 4, featuring the company's new automatic boiler feed. The new machine will pump feed water against high boiler pressure and feed it so as to maintain a constant water level, and will return condensation to the boiler and supply make-up water as required. No steam is used in operating the new boiler feed.

Copies of the bulletin may be secured by addressing the company at 1903-1915 E. Hagert Street, Philadelphia.

J. E. MEANS NAMED DISTRICT MANAGER OF TEX-MEX

J. E. Means, vice-president of the Tex-Mex Natural Gas Company, has been appointed district manager of the company with headquarters at Kingsville, Texas. For the past two years Mr. Means has been associated with the Houston Natural Gas Company, an affiliated organization, in the capacity of manager of new business, chief engineer, and later as distribution engineer.

The Tex-Mex Company has recently secured a gas franchise in Bishop, to which gas will be piped at an early date.

P. G. AND E. TO SELL PREFERRED STOCK AT $10,000,000

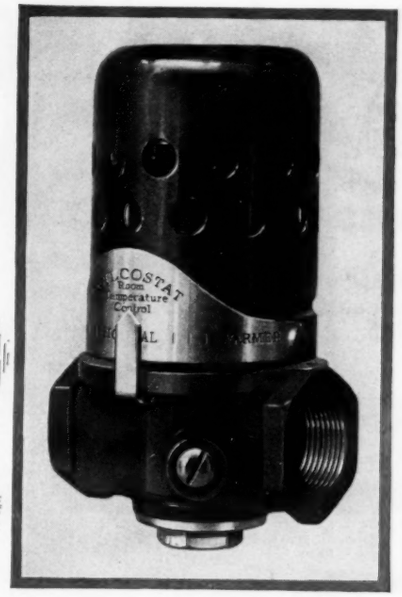
Pacific Gas and Electric Company, with headquarters in San Francisco has been granted authority by the California Railroad Commission to issue and sell $10,000,000 of preferred stock. The money raised through the sale of the stock will be used for improvements to existing services, and for additions to the company's systems.

CRAIG, COLO., GRANTS NATURAL FRANCHISE TO A. A. ODLUM

A 25-year franchise has been granted to Arnold A. Odlum of Denver, for the service of natural gas in Craig, Colorado.

An important new feature for increasing sales of

Gas-Fired Circulating Heaters



THE WILCOSTAT

Automatic Room Temperature Control

IN cooperation with manufacturers and retailers of gas-fired circulating heaters, The Wilcolator Company has developed the Wilcostat Automatic Room Temperature Control to meet the demand for a reliable, attractive, low-priced thermostat for this type of heater.

The Wilcostat assures merchandising value in combination with the heater, as well as for installation on heaters already in service. It offers the same big opportunity for increased sales of gas circulators as the oven heat control brought to the gas range industry.

Let us put all the facts and figures about the Wilcostat before you. Your letter will receive immediate attention.

Exhaustive and lengthy tests of the operation of the Wilcostat have emphasized the following features:

1—Maintains any room temperature between 55° and 85°F. within 1° of the temperature desired.

2—Ruggedly constructed with graceful lines. Small and compact.

3—Finished in colors blending with the present popular heaters.

4—Can be easily and economically installed on heaters already in service.

5—The valve may be removed for cleaning without disturbing pipe connections or changing calibration.

6—Has adjustable by-pass and pilot light outlet.

THE WILCOLATOR COMPANY, Newark, N. J.

Specialists in Temperature Control for Household Appliances

WATER
or
GAS
Connections

whether screw thread or gasket, should be made up with KEY TITE PIPE JOINT COMPOUND.

KEY TITE PIPE JOINT COMPOUND is not a quick hardening cement, but a plastic lubricant and a filler that will seal the most obstinate joint with ease. It covers more surface than an equal volume of red or white lead, thereby reducing the cost. It is waterproof—and there is no waste.

Manufactured by

E. A. Key Co., Inc.

2814 Santa Fe Ave.
Los Angeles, Calif.

Distributors in all principal cities.

WRITE FOR FREE SAMPLE

Coast Counties G. and E. Women's Committee members and guests in celebration of the Committee's third year of successful activity

Women's Committee Conducts Varied Activities

THE Women's Committee of Coast Counties Gas and Electric Company of Santa Cruz, California, has widened the scope of its activities to include a first aid class. Miss Jean Matthews, a member of the committee, will act as instructor for the class, which will meet each Thursday evening at 7 o'clock.

Activities of the Women's Committee make it an outstanding employee unit in the company organization, although only three years old. The third annual birthday celebration was held recently at Hotel Palomar, short talks being made by J. B. Wilson, president of the company; A. E. Strong, general superintendent, and by Alma Freeburg, president of the Women's Committee.

Following the dinner, the group joined an all-employee party being held in the ballroom of the hotel.

EXHIBIT SPACE FOR PETROLEUM EXPOSITION IS INCREASED

William B. Way, general manager of the International Petroleum Exposition to be held October 4 to 11, at Tulsa, Oklahoma, has announced that more than 400 indoor booths and 100,000 square feet of outside space is now available to exhibitors, with the addition of the Marketers and Refiners Building, which has added 14,500 square feet of indoor space to the exposition grounds.

The administration offices of the Exposition have issued more than 5,000 illustrated folders to executives of foreign countries, and posters have been placed in the foreign offices of the American Railway Express Company.

Announcement is also made to the effect that the annual meeting of the Petroleum Division of the American Society of Mechanical Engineers will be held coincidentally with the exposition.

FRANK P. PARISH & COMPANY OPENS DALLAS OFFICE

H. S. Lyons, representing Frank P. Parish & Company of Chicago, identified with the Missouri-Kansas Pipe Line Company, has opened offices in the Republic Bank building in Dallas.

Mr. Lyons has announced that the Missouri-Kansas Pipe Line Company will shortly issue rights entitling stockholders of record May 15 to purchase one share of Class B stock for each share of common stock owned. According to announcement the Class B stock will be $1.00 per share and rights are to be exercised before June 15. Frank P. Parish is president of the Missouri-Kansas Pipe Line Company.

L. A. NORDAN RESIGNS POST WITH SOUTHERN GAS CO.

L. A. Nordan has resigned as vice-president and general manager of the Southern Gas Company which has headquarters at San Antonio. He became general manager of the company in 1928 and in 1929 was made vice-president, at the same time retaining his former title. He became identified with the Moody-Seagraves interests in 1926.

MISS OR LYNN McKOANE ADDED TO SAN DIEGO CONSOL. STAFF

The Home Service Department of the San Diego Consolidated Gas and Electric Company has added Miss OrLynn McKoane to its staff. Miss McKoane was formerly in charge of the Home Service Department of the Northern States Power Company at Fargo, North Dakota.

San Diego Consolidated plans a program of expansion for the Home Service Department, and has in view the establishment of a model kitchen in the Electric Building, where all major gas and electric appliances will be installed. Classes will be held there twice weekly, and special advertising will bring these classes to the attention of the community.

W. W. TAYLOR WILL MANAGE FOR MUNICIPAL AT McKINNEY, TEX.

Wilbur W. Taylor has been appointed manager of the McKinney, Texas, property of the Municipal Gas Company, succeeding at this post R. E. Wallace, resigned. Mr. Taylor was formerly assistant manager of the company's plant at Corsicana, and has been connected with that plant for the past five years. Mr. Wallace had been with the company for the past 10 years.

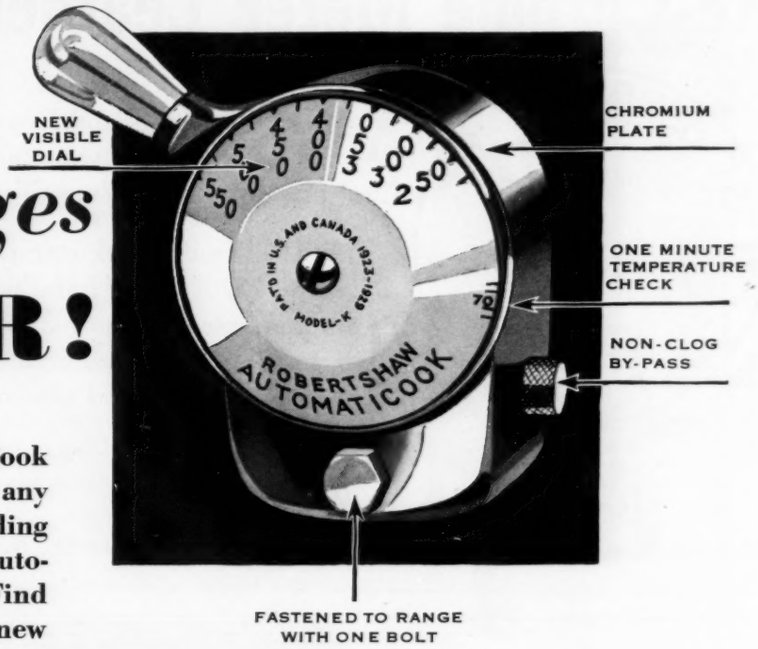
EMPIRE PUBLIC SERVICE BUYS CENTRAL TEXAS GAS CO.

Announcement is made of the acquisition by the Empire Public Service Corporation of the Central Texas Gas Company, serving a number of communities in central Texas, and the Clarksville Gas Company, supplying gas at Clarksville, Ark. F. W. Woodcock is president of the Empire Public Service Corp.

CUTBANK, MONT., GRANTS GAS FRANCHISE TO DRUMHELLER

A natural gas franchise has been granted at Cutbank, Montana, to Jerome L. Drumheller of Spokane, Washington. The gas will be supplied from a new well just brought in on a site seven miles north of Cutbank, by the Montana Headlight Oil Company, of Spokane, Washington.

The NEW "K" *Type* AutomatiCook *is selling Gas Ranges* FASTER!



THE new "K" Type AutomatiCook is a definite selling point on any range. And more than 100 leading makes of gas ranges will be AutomatiCook equipped this year. Find out the selling arguments of the new AutomatiCook—*now!*

It's smaller, more compact, better looking. Chromium plated. A full vision dial. An absolutely foolproof One-Minute Temperature Check. A non-clog by-pass. Only *one* bolt secures the AutomatiCook to the range. The AutomatiCook is so designed that temperature setting, calibrating and all working parts are accessible from outside the range.

Study up on the new AutomatiCook, now. Write for our descriptive literature. We'll be glad to send this literature to your salesmen and service men, too. Just send us their names. But write *now*—if you want to make selling of gas ranges easier this year!

ROBERTSHAW AutomatiCook

ROBERTSHAW THERMOSTAT COMPANY
Youngwood, Penna.

PLAY SAFE!

By Specifying and Using

"COLONIAL" BRAND

Re-Chrome Meter Leather

BESSE, OSBORN & ODELL INC. · COLONIAL BRAND · BOSTON, U.S.A. · RE-CHROME METER LEATHER

in your New Meters and Repair Work. This Leather will stand the Five-Minute Boiling Test.

This Trade Mark stamped on each New Zealand Lambskin is our guarantee to you that each skin has received the greatest care in its selection and tanning.

Besse, Osborn & Odell, Inc.

51 South Street, Boston — 177 William St., N. Y.

Every User of Refractories

will want a copy of our new handbook and catalogue. Within its 68 pages will be found comprehensive information relating not only to the manufacture of fire brick, standard and special shapes, bonding materials and plastic fire brick, but also a vast amount of valuable technical information including tables, etc.

This useful handbook will be sent free to users of refractories.

Gladding, McBean & Co.

San Francisco — Los Angeles
Portland — Seattle
Spokane — Oakland

NO-OX-ID IRON RUST

TRADE MARK

The Original Rust Preventive

There is a method with NO-OX-ID that never fails.

DEARBORN CHEMICAL COMPANY

LOS ANGELES:
807 Mateo Street
Phone TRinity 3385

SAN FRANCISCO:
252 Spear Street
Phone Davenport 658

DEARBORN CHEMICAL COMPANY

NO-OX-ID-IZED WRAPPER

NEW YORK — CHICAGO

NEW HUNTINGTON PARK OFFICE FOR L. A. G. AND E. CORP.

With ceremonies conducted under the auspices of the Huntington Park Chamber of Commerce, ground was broken recently for the new district office building of Los Angeles Gas and Electric Corporation in Huntington Park, California. Headquarters for the company are in Los Angeles.

The new building, which will represent a total investment of approximately $180,000, will be of class A construction, two stories in height, with basement and mezzanine floor. Foundation construction will permit of an additional story later on. Work is expected to be completed this year.

The territory to be served by the new district office includes Huntington Park, Bell, Maywood, Watts and adjacent territory, heretofore served only by a branch office in Huntington Park. Where before the only business transacted locally was the payment of bills and the ordering of service, all commercial transactions of the corporation will be carried on in the new district office. This office will also be headquarters for gas distribution activities of the section.

PHILOKLA GAS CO. ORGANIZED TO HANDLE OKLA. CITY FIELD GAS

Announcement has been made of the formation of the Philokla Gas Company by the Phillips Petroleum Company and the Oklahoma Natural Gas Corporation, which have organized the company for the purpose of handling gas from the Oklahoma City field after it has passed through the natural gasoline plants of Phillips Petroleum Company. The gas, after extraction, will go to the compression plant of Philokla Gas Company where the pressure will be increased. This gas will then be marketed by the Oklahoma Natural Gas Corporation, either through its retail channels or to producers in the field. The compressor plant of the new company will have a capacity of 25,000,000 cubic feet daily.

PERSONNEL CHANGES IN DIXIE GAS & FUEL ANNOUNCED

W. B. Currey has been appointed general manager of the Dixie Gas & Fuel Company at Beaumont, Texas, succeeding H. P. Carroll, who recently took over the position of operating manager of Houston Gas & Fuel Company, assisting Alba H. Warren, general manager of the Houston company.

W. H. Langston has been appointed manager of the central district of the Dixie system, along with his duties as manager of the northern district of the company.

SPENCER THERMOSTAT CO. ISSUES "STORY OF THE SPENCER DISC"

Spencer Thermostat Company of Cambridge, Mass., has published a 16-page booklet entitled "The Story of the Spencer Disc." The brochure gives a brief history of the invention and manufacture of the disc which is used as the thermostatic element in all "Klixon" products. Copies may be had by writing the above address.

SOUTHERN UNION BUYS DURANGO NATURAL GAS CO. HOLDINGS

The Southern Union Gas Company, which has secured franchises in Santa Fe and Albuquerque, New Mexico, has taken over the properties of the Durango Natural Gas Company, Durango, Colorado, including the company's holdings in Ute Dome, New Mexico.

Restaurant GAS RANGES

Wedgewood

Restaurant GAS OVENS

Meeting the present increased demand for modern Restaurant Gas Range equipment and extensively used in Hotels, Short-order Restaurants, Cafeterias, Boarding Houses, Clubs, Hospitals, Fraternities and Churches.

The name "WEDGEWOOD" is a guarantee of quicker service, better cooking, perfect frying and baking, lower operating cost and greater working convenience.

The Most Modernly Equipped and Versatile of All Restaurant Gas Range Lines . . . . . .

Particular attention is called to the extra large cooking tops, the larger and heavier top gratings, the heavy doors and reinforced hinges, the heavier gauge sheet iron, quick action burners and extra size ground and polished griddles. . .

With One or Two Ovens

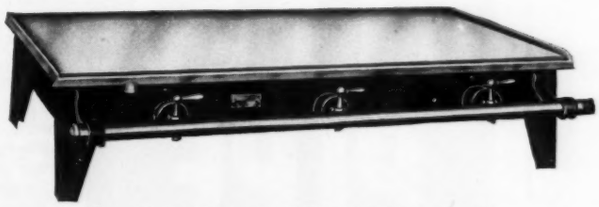
Or with oven and broiler. Either with or without high shelf and with or without griddle.

Pastry Ovens

Single or double ovens for roasting and baking. Steel and heavier gauge sheetiron, with bariron legs. Heavy doors and reinforced hinges. Double tubular burners and Toncan oven linings.

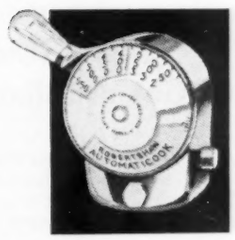
Don't Miss the WEDGEWOOD Cooking Recipes

and the delightful Musical Program every Tuesday—11:10 A. M. over the Pacific N.B.C.



2 and 3 Burner Griddle Hot Plates

Special large griddles, ground and polished, with grease groove along front. Loop burners and extra heavy stamped steel body and legs.



Wedgewood Pastry Ovens can be equipped with oven heat control if desired.

JAMES GRAHAM MANUFACTURING COMPANY

LARGEST IN THE WEST—SINCE 1882

SAN FRANCISCO NEWARK, CALIF. LOS ANGELES

EMPIRE
Oil Meters

Positive Displacement
Oscillating Piston Type

Simple in Construction—Easy to Operate—Low in Cost of Maintenance

EMPIRE meters are highly accurate, and **stay** accurate. They are invaluable for cracking and absorption processes; for gas companies; for refiners and distributors of gasoline and all distillates of petroleum; for measurement of crude oil, cold or hot.

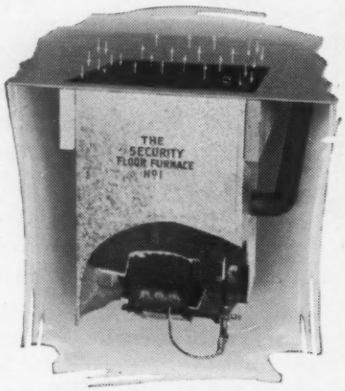
ALL SIZES ½" TO 6"

Standard meters will withstand working pressures of 150 lbs. to the square inch. High pressure types will handle 325 lbs. Higher pressures and special types to order.

National Meter Company

299 Broadway, New York

1048 Folsom Street, San Francisco **2309 E. 8th Street, Los Angeles**



We Manufacture a Full Line of Strictly

High Grade Gas Appliances

Including

Conversion Gas Burners
Circular Heaters
Warm Air Furnaces
Gas Ranges

Our Catalog is yours for the asking

SECURITY STOVE & MFG. CO.

Kansas City, Mo.

SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

Classified Advertising

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge. Small professional cards 1-in. deep by 21 ems wide are $5.00 monthly on 12-time contract.

HELP WANTED—MALE

WANTED — SALES REPRESENTATIVES and distributors by Eastern manufacturer. A new gas range accessory that offers a good proposition. Address Box E-66, *Western Gas,* 124 West Fourth Street, Los Angeles, California.

SITUATIONS WANTED—MALE

Industrial gas engineer having seven years experience designing industrial furnace equipment for high and low B.t.u. gases desires position with manufacturer or utility on engineering or sales. Address Box E-26, *Western Gas,* 124 West Fourth Street, Los Angeles, California.

Married man 30 years of age, general office man, desires connection with gas company in Oklahoma or Texas. Reference if desired. Address Box B-77, *Western Gas,* 124 West Fourth Street, Los Angeles, California.

House heating and industrial engineer with 20 years experience in the natural gas industry desires position with gas company or equipment firm. Applicant has thorough knowledge of all types of gas heating equipment, and is capable of organization work, as well as compiling manuals. Address Box No. B-97, *Western Gas,* 124 West Fourth Street, Los Angeles, California.

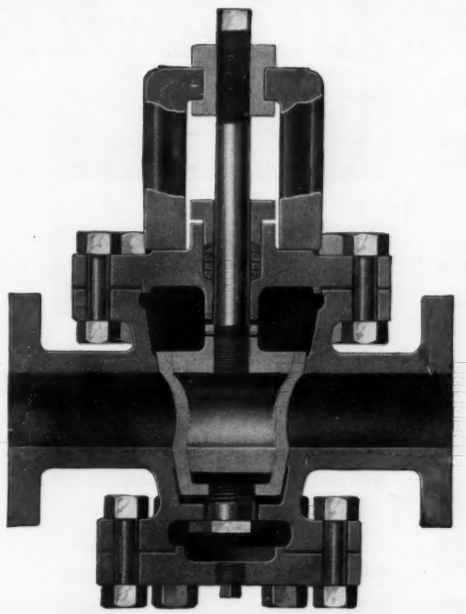
PERFECTION STOVE CO. OFFERS GAS-FIRED REFRIGERATOR

Perfection Stove Company of Cleveland, Ohio, announces the production of a new gas-fired refrigerator which will sell under the name of "Superfex." The new refrigerator is produced in two models, one without a running water connection. The other requires a connection for the circulation of running water while the burners are lighted. The company also manufactures an oil-burning refrigerator.

WYANDOTTE COUNTY GAS CO. TO SERVE MORE KAN. TOWNS

Wyandotte County Gas Company, serving natural gas at Kansas City, Kansas, will extend its service to Turner, Kansas, not far distant, according to press report. The company also contemplates extending its lines to Welborn, Kansas, six miles west of the city. The line to Turner will cost approximately $20,000. W. H. McKenzie is manager of the Wyandotte County Gas Company.

FOSTER



PLUG VALVES

"Guaranteed for Ten Years"

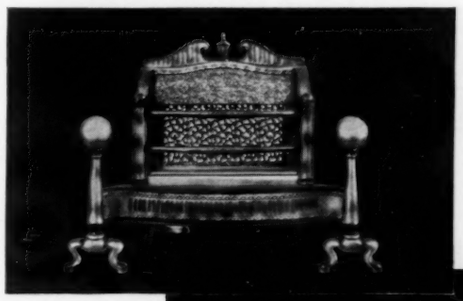
1. Adjustable.
2. Non-Lubricated.
4. Removable Seat and Plug.
5. 100% Opening Through Valve.
6. Stainless Steel Plug.
7. No Friction Loss.
8. No Eddy Currents.
9. Cannot "Stick" or "Freeze."
10. Kerosene Tested.
11. Re-Packed Under Pressure.
12. Clean-Out Plug on Bottom.
13. Seats Removed Without Taking Valve From Line.
14. Sizes 2" to 6" Iron or Steel For All Pressures.

Exclusive Distributors

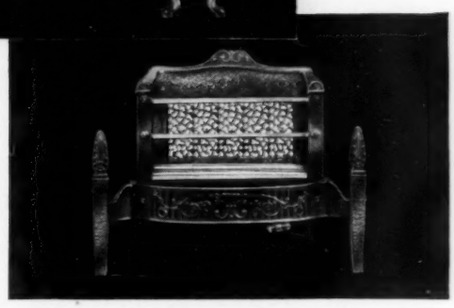
DUCOMMUN CORPORATION

Los Angeles San Francisco

Guardian's *Cordeveaux . . . . . Finish* is Guaranteed... Tarnish-Proof



The Colonial Model 10 Element Size



The Mayfair Model 10 Element-Size

Records from dozens of gas companies show that Guardian heaters will outsell all others, when placed in a floor display competition. The designs are graceful; the finish is rich and colorful; materials and workmanship are obviously finer.

And now you can positively guarantee the finish not to tarnish.

Details, catalog and price list upon request.

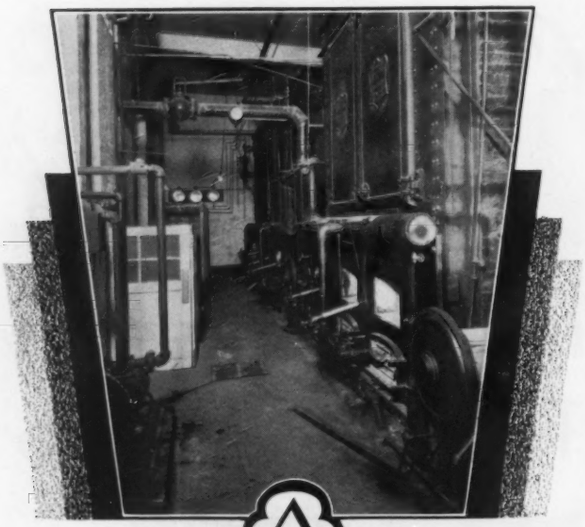
in the Cordeveaux finish

THE GUARDIAN GAS APPLIANCE CO.
1364 East 47th Street, Cleveland, Ohio

Guardian

FIREPLACE AND PORTABLE HEATERS

WEBSTER Radiant Gas Burners



Some Said It Couldn't Be Done...But—

Mr. E. J. Ronsick, Industrial Engineer of the Texas Cities Gas Company, El Paso, did it with Webster Gas Burners.

And a difficult job it was! The oil burners already installed could not be changed or removed nor could the boiler fronts be altered in any way.

After much investigation, Webster Radiant Gas Burners were Mr. Ronsick's choice due to the fact that they are flexible enough to fit almost any opening. The burners, in this case, seemed to have been made just for such a difficult installation.

Again, through engineering skill and the superior construction of Webster Radiant Gas Burners, another job was made easy.

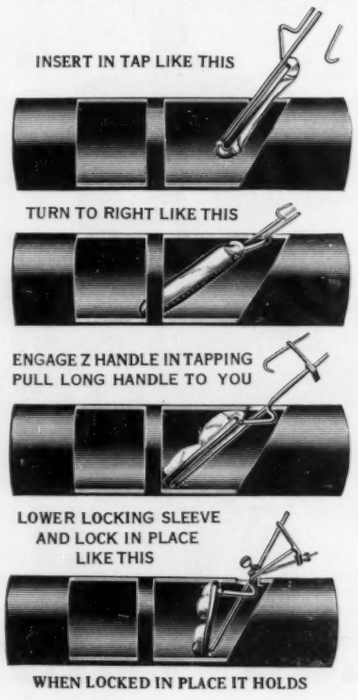
You have similar problems coming up all the time. We would remind you that Webster service stands back of every burner which you or our engineers install.

May we give you further information? . . . write today.

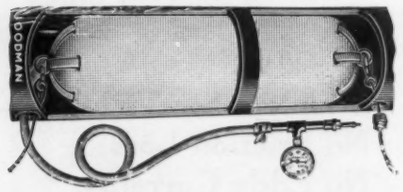
The Webster Engineering Co.
TULSA - OKLA.
Boiler Burner Division of
The Surface Combustion Co.
Subsidiary of Henry L. Doherty & Co.
2375 DORR STREET TOLEDO OHIO
Branch Offices in All Principal Cities
Member of Industrial Furnace Manufacturers Association

PIPE STOPPERS PLUGS MASKS Etc.

HOW TO USE THE GOODMAN STOPPER

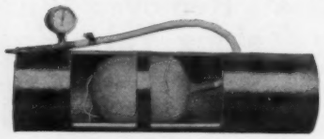

INSERT IN TAP LIKE THIS
TURN TO RIGHT LIKE THIS
ENGAGE Z HANDLE IN TAPPING
PULL LONG HANDLE TO YOU
LOWER LOCKING SLEEVE
AND LOCK IN PLACE
LIKE THIS
WHEN LOCKED IN PLACE IT HOLDS

GOODMAN CYLINDRICAL STOPPER PATENTED



Increased length for increased pressures

CANVAS-COVERED GAS MAIN BAGS

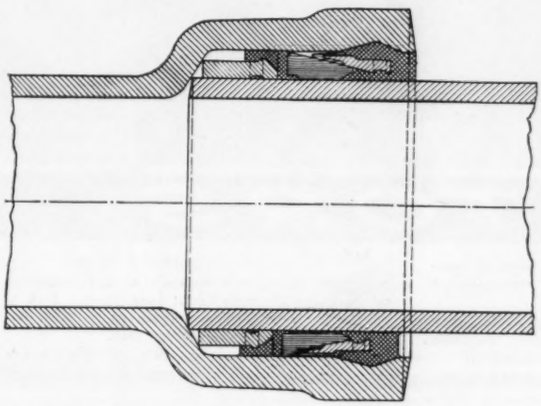


Safety Gas Main Stopper Co.
523 Atlantic Ave., Brooklyn, N. Y.
Cable Address: Gastopper, N. Y.

What Is the Flexpan Joint?

The Flexpan (Flexible-Expansion) Joint is designed for cast iron bell and spigot pipe for high, medium, and low gas pressures.

It is a factory-made and factory-inspected joint. The joint is shipped from the pipe foundry in the bell of the pipe, ready for calking.



Showing Flexpan Joint In Place In Bell of Cast Iron Pipe

The top section of the illustration above shows the joint materials in place in the bell as they look **before** calking.

The bottom section of the illustration shows the position of the joint materials **after** calking.

Flexpan Joints have been deflected several inches under 90 pounds air pressure without leakage, the bottom wedges functioning to automatically compress the joint materials as deflection takes place.

Many tests have been made demonstrating that the joint is proof against expansion and contraction, in one case the spigot having been moved in and out like a piston a distance of ¼-inch 315 times under 90 pounds of air without a sign of leakage.

For full details of this new joint that removes the LAST OBJECTION to using permanent pipe (cast iron) for gas, write:

Pacific States Cast Iron Pipe Co.

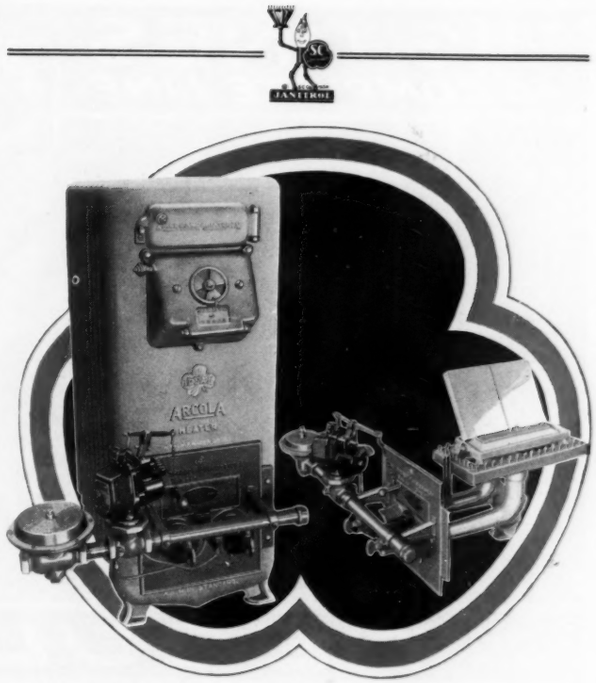
Provo, Utah

111 Sutter St.....SAN FRANCISCO
Subway Terminal.....LOS ANGELES
326 F. N. B. Bldg.....DENVER
149 W. 2nd South St.....SALT LAKE
611 Spalding Bldg.....PORTLAND

Makers of

"Pacific" Cast Iron Pipe

Sizes: 1¼ to 12 inches



A New Gas Burner for ARCOLA BOILERS

The Type R. JANITROL, built especially for converting coal burning Arcolas to complete gas fired systems, is ready for shipment. It was carefully developed and represents a burner which we can recommend as being efficient, economical and worthy of your acceptance. It completes the JANITROL line.

It widens your field both for JANITROL and future sales of complete gas fired equipment.

It quickly builds up a domestic meter load in homes that in general are not profitable.

It is compact, quickly and easily assembled and installed, thoroughly reliable and efficient in operation.

Write for catalogue giving complete specifications and information on this new type JANITROL.

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INCORPORATED
Subsidiary of Henry L. Doherty & Co.
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Branch Offices in All Principal Cities
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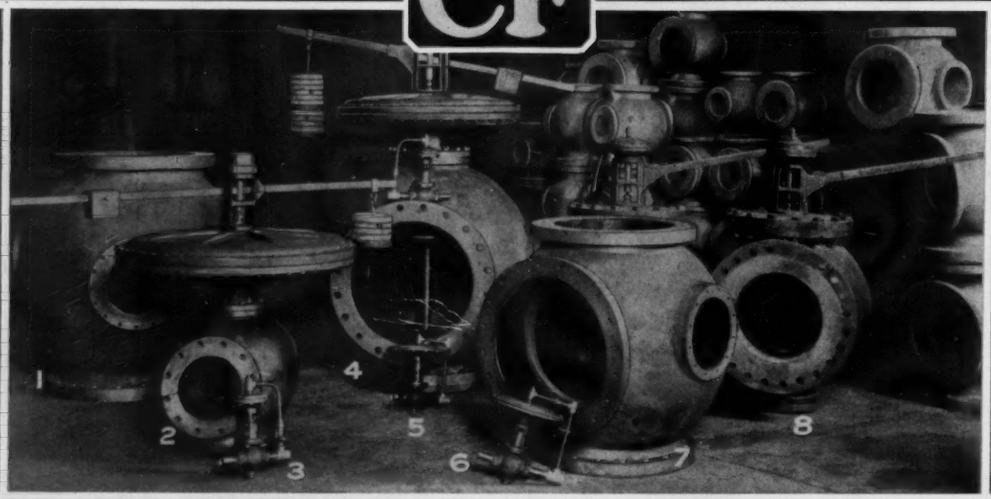
BIG ONES OR LITTLE ONES
-A COMPLETE LINE CF OF DEPENDABLE

1 BODY FOR TWENTY-FOUR-INCH LOW PRESSURE REGULATOR.
2 A TEN-INCH DIFFERENTIAL REGULATOR.
3 A THREE-FOURTHS INCH HIGH PRESSURE REGULATOR.
4 TWENTY-FOUR-INCH DIFFERENTIAL REGULATOR FOR MIXING GASES.



5 ONE-INCH HOUSE REGULATOR.
6 ONE AND ONE-HALF INCH HOUSE REGULATOR.
7 BODY OF A TWENTY-INCH WEIGHTED ILLUMINATING REGULATOR.
8 A SIXTEEN-INCH HIGH PRESSURE REGULATOR.

REGULATORS

Greater Dependability and accuracy has been the Chaplin-Fulton goal for over forty years of experience in controlling gas pressure. Being today's standard is the result of ceaseless effort to improve design, materials, and workmanship. During this time there have been developed many varying types of regulators—enough to meet every major requirement of gas control.

Chaplin-Fulton therefore represents a most complete and a highly dependable line of products. Catalogues are available which describe each Regulator.

THE CHAPLIN-FULTON MFG. CO.
Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in all sizes, from 1 inch to 24 inches; for all services, 1 oz. up to 2,000 lbs. pressure to square inch.
28-40 Penn Avenue Pittsburgh, Pa.

—add to Your Industrial Load by Selling KANE

Gas Boilers . . .

A gas-fired Kane process steam generator offers yet another feature of real economy to process steam users everywhere—**large heating boilers that are kept going during the Summer months for no other purpose than to supply process steam, can be shut down.**

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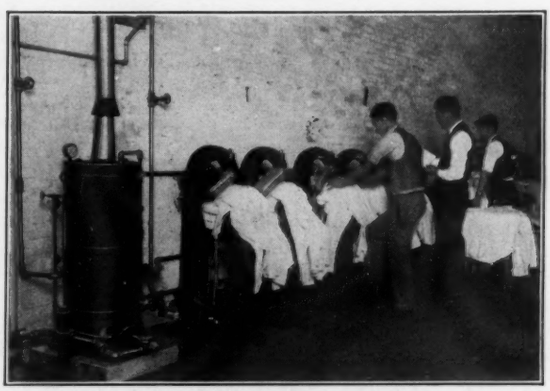
Booklet 2K6 gives helpful information for determining horsepower requirements of any installation. (Stock boilers constructed for working pressures up to 100 lbs. Boilers for higher pressures built to order.)

The many advantages of automatic Kane Gas Boilers for supplying process steam are given in a colorful folder prepared for distribution to prospective users on your lines. **Sample copies sent upon request.**



Kane users cover an amazing range of Industries: Textile Plants, Laundries, Hospitals, Hotels, Dairies, Cleaners & Dyers, Bottling Plants, Bakeries, Chemical Plants, Food Industries, etc. Wherever the Kane is used, satisfaction invariably results, as shown by repeat orders from every quarter.

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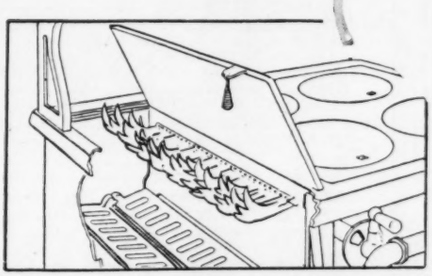
Makers of Automatic Gas Boilers for over a Quarter Century



"Spark"
Extension Burner
in Operation

SPARK

EXTENSION TOP STOVE *with the* GRIDDLE ATTACHMENT

IS A FRIEND MAKER

and helps lead prospective stove buyers to the store which features the stove with the EXTENSION TOP — an exclusive Spark "Patented" feature which adds ONE-HALF more gas top cooking surface than any other gas stove of similar size.

MANUFACTURED BY
Hammer-Bray Co.
Oakland California

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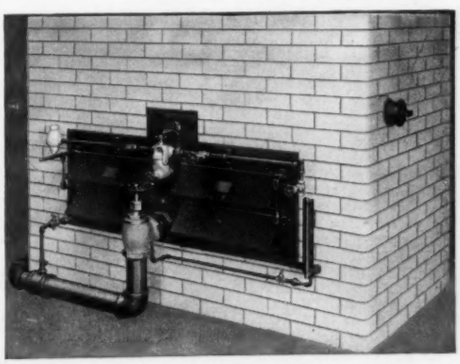
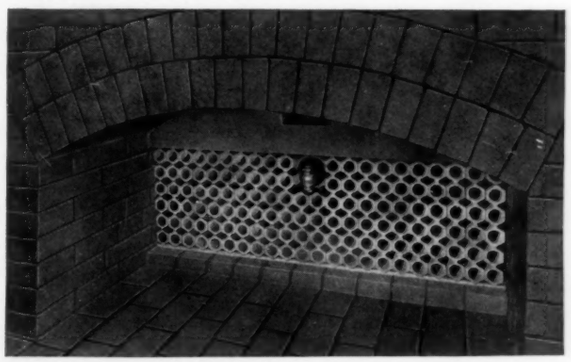
A change to the Leahy Multi-jet Unit *Insures* Efficiency, Capacity, and Satisfaction



Front View—Showing Installation of Combination Gas and Oil Unit.



Rear View—Same Installation—Note All Parts of Gas Burner Exposed to Radiant Heat or Oil Burner Flame are Protected by Refractories, Insuring Long Life.

Its Many Exclusive Features Have Created an Exceptional Demand. Request Bulletin 19-E, Which Explains the Many Reasons for Its Great Success. Designed for Front, Rear, and Vertical Firing.

For Modern, Inexpensive, Efficient Method of Burning Gas and Oil Under Oil Field Boilers Request Bulletin 18-A and 20-A.

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COMPRESSOR PLANT DESIGN AND CONSTRUCTION
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Established 1910
Analyses and tests. Represent Pittsburgh Testing Laboratory for inspection at Eastern foundries, mills and shops.
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920 Santee St. Los Angeles
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If you would keep in touch with the Gas Industry developments in the West, send a check for $2.00 to

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THEY MUST TEST TO A SINGLE STANDARD... the standard of WALWORTH QUALITY

• The line of Walworth valves today is fundamentally a quality line. • All of our products are subject to certain standard Walworth tests which assure satisfactory service. • In making valves, however, we go a step farther and test every one of them individually before shipment. • This means that when you put a Walworth valve in any installation it will take up its share of responsibility as unfailingly as though you had picked it out and tested it yourself.

Specify

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for **GAS**

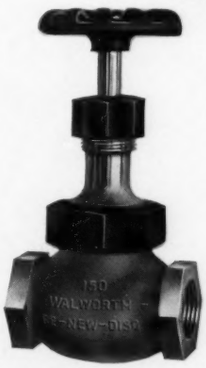

FIG. 227 GLOBE VALVE

• WALWORTH RE-NEW DISC VALVE • Although designed for lighter pressures than the higher rated Walworth Bronze Valves, the Re-New-Disc is a glutton for punishment. • It is solidly, ruggedly built and its renewable disc gives the valve a new lease of life time and again through years of unfaltering service. • It is recommended for steam working pressures up to 150 pounds.

FIG. 227A ANGLE VALVE

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WALWORTH CALIFORNIA CO., 235 Second St., San Francisco

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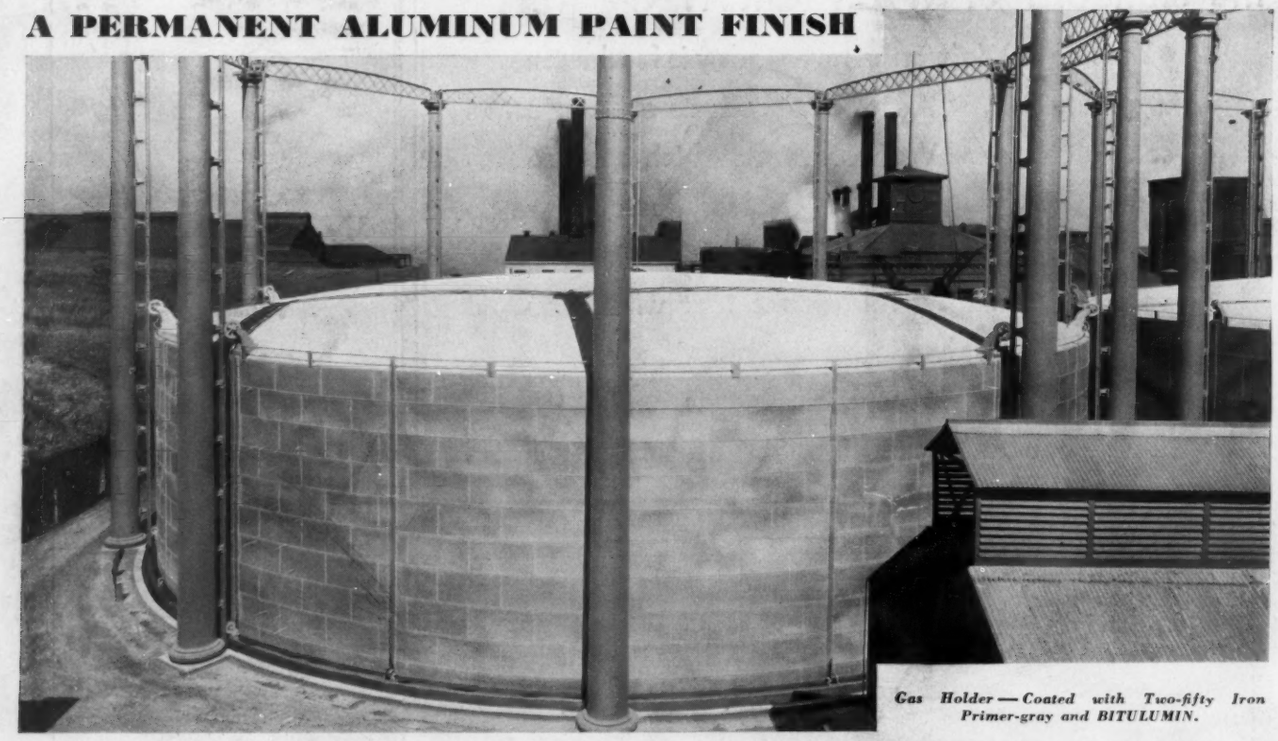

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